MARUDHAR KESARI JAIN COLLEGE FOR WOMEN (AUTONOMOUS)

Vaniyambadi – 635 751

PG Department of Computer Applications

for

Undergraduate Programme

Bachelor of Computer Applications

From the Academic Year 2024-25

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1. **Preamble**

   The Department of Computer Applications started a programme as Specialization on BCA-1998 MCA-2002. As College is granted academic autonomy in the year 2024 it has the privilege of restructuring the syllabus and introducing new career oriented industry ready programs. Keeping an eye on the industry and to modernize the curriculum, the Board of Studies of the Department of Computer Applications, has initiated an industry collaboration to impart Bachelor of Computer Application, specialized in Mobile Applications and Cloud Technology. This programme comprises complementary course Mathematics and vocational course Cloud Technology.The main objective of this programme is to inculcate and horn up the skills of young minds in new generation technologies to compete in the knowledge era. This programme is designed in such a way that students can have a detailed knowledge of subjects as well as the knowledge of IT related applications. Throughout this programme the students will go through the IT scenario, its scope, career and the essentials of the IT world. This unique programme provides dual career options for the students in the latest and fast growing technology sectors of Mobile Applications and Cloud Technology.The syllabus aims to focus on enabling the students to familiarize with the new technologies, and at the same time enhance and strengthen the fundamental knowledge in Computer Applications, and related fields.

PROGRAMME OUTCOMES (PO)

Programme	B.C.A
Programme Code	UA07
Duration	3 Years
ProgrammeOutcomes	**PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that forma part of an undergraduate Programme of study.

| | **PO2:CommunicationSkills:**Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write an atypically, and present complex information in a clear and concise manner to different groups.

PO3:Critical thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO4: Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

PO5: Analytical reasoning: Ability to evaluate their liability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

PO6:Research-relatedskills:Asenseofinquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret anddrawconclusionsfromdata,establishhypotheses,predictcause-and-effect relationships; ability to plan, execute and report the results of an experimentor investigation.

PO7:Cooperation / Teamwork: Ability to work effectively and respectfully with diverse teams ; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause |

	and work efficiently as a member of a team.
	PO8: Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data ; and critically evaluate ideas, evidence, and experiences from an open-minded and reasoned perspective.

Programme Specific Outcomes:	**PSO1– Placement:**
	To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, and beliefs and apply diverse frames of reference to decisions and actions.
	PSO2-Entrepreneur:
	To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skills that will facilitate startups and high potential organizations.
	PSO3 –Research and Development:
	Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards Growth and development.

Eligibility for Admission:

Candidates for admission to the first year of the Bachelor of Computer Applications course shall be required to have passed the Higher Secondary Course Examination (Academic or Vocational) by the Government of Tamilnadu withMathematics / Business Mathematics / Statistics / Computer Science / Commerce / Accountancy as a subject.

Methods of Evaluation and Assessment

Methods of Evaluation		
Internal Evaluation		25 Marks
External Evaluation	End Semester Examination	75 Marks
	Total	**100 Marks**
Methods of Assessment		
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand / Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, short summary or overview	
Application (K3)	Suggest idea/concept with examples, suggest formulae, solve problems, Observe, Explain	
Analyze (K4)	Problem-solving questions, finish a procedure in many steps, Differentiate Between various ideas, Map knowledge	
Evaluate (K5)	Longer essay/Evaluation essay, Critique or justify with pros and cons	
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations	

Semester – III						
24UFTA31	Tamil – 3	4	1	0	0	3
24UFEN31	English – 3	4	1	0	0	3
24UCAC31	CC – 5 Java Programming	3	1	2	0	5
24UCAC32P	CC – 6 Practical IV-Programming in Java Lab	0	0	4	0	2
24UCAE31 / 24UCAE32	EC - 4 Web Technology/ Open Source Software	3	1	0	0	4
24UCAE33P / 24UCAE34P	EC - 5 AL Practical V-Web Technology Lab/ Open Source Software Lab	0	0	2	0	2
24UCAS31	SEC -4 Multimedia Systems	1	0	1	0	2
24UAEC31	AEC – 2 Human Values and Indian Knowledge System	1	1	0	0	2
					30	23

Semester – IV						
24UFTA41	Tamil – 4	4	1	0	0	3
24UFEN41	English – 4	4	1	0	0	3
24UCAC41	CC – 7 Python Programming	3	1	2	0	5
24UCAC42P	CC – 8 Practical VI-Python Programming Lab	0	0	4	0	2
24UCAA41 24UCAA42	EC - 6 AL Relational Database Management System/ Computer Graphics	3	1	0	0	4
24UCAA41P 24UCAA42P	EC - 7 AL Practical VII-RDBMS Lab/Computer Graphics Lab	0	0	2	0	2
24UCAS41	SEC – 5 Data Mining	1	0	1	0	2
24UAEC41	AEC – 3 Environmental Studies	1	1	0	0	2
					30	23

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAC31	**Java Programming**	**Core**	3	1	2	0	5	6	25	75	100

Learning Objectives	
LO1	Learn about the history and evolution of Java and its core features.
LO2	Implement Inheritance, method overloading and method overriding, polymorphism and Importing Packages.
LO3	Understand the concept of streams and their role in input/output operations.
LO4	Explore the events and their role in interactive GUI applications using AWT.
LO5	Explore the hierarchy of Swing components and their relationship with AWT.

Unit	Content	Hours
1	**Introduction:** Review of Object Oriented concepts – History of Java – Java buzzwords JVM architecture – Data types - Variables - Scope and life time of variables - arrays - operators – control statements - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.	14
2	Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes. Packages: Definition-Access Protection Importing Packages. Interfaces: Definition Implementation- Extending Interfaces. Exception Handling: try – catch- throw - throws – finally – Built-in exceptions.	14
3	Multithreaded Programming: Thread Class - Runnable interface –Synchronization–Using synchronized methods– Using synchronized statement- Inter thread Communication. I/O Streams: Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.	14
4	AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers. Event Handling: Events - Event sources - Event Listeners - Handling Mouse and Keyboard Events - Adapter classes - Inner classes	14
5	Swing: Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel, JTextField - JTextArea - JList - JComboBox - JScrollPane.	14

CO	Course Outcomes- On completion of this course, students will be
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.
CO3	Implement multi-threading and I/O Streams of Core Java
CO4	Implement AWT and Event handling.
CO5	Use Swing to create GUI.

Textbooks:

1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010
2	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999
3	"Java: How to Program" – Paul Deitel & Harvey Deitel, Pearson Education
4	"Java Programming for Beginners" – Mark Lassoff, LearnToProgram Media
5	"Head First Java" – Kathy Sierra & Bert Bates, O'Reilly Media 2017

Reference Books:

1	Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010
2	P.Rizwan Ahmed, Java Programming, 3rd Edition, Margham Publications, 2017
3	"Core Java Volume I – Fundamentals"&"Core Java Volume II – Advanced Features" Cay S. Horstmann, Pearson Education
4	"Java Network Programming" (4th Edition) Elliotte Rusty Harold, O'Reilly Media
5	"Java Performance: The Definitive Guide", Scott Oaks, O'Reilly Media

Web resources:

1	https://javabeginnerstutorial.com/core-java-tutorial
2	http://docs.oracle.com/javase/tutorial/
3	https://www.coursera.org/
4	https://docs.oracle.com/en/java/
5	https://www.programiz.com/java-programming

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	2	1	1	3	1	2
CO2	3	3	3	2	2	2	1	2	3	2	3
CO3	2	3	3	3	2	1	2	2	2	3	3
CO4	2	2	3	2	2	1	1	3	2	2	2
CO5	2	3	3	3	3	2	1	3	3	3	3
Total	12	13	15	12	10	8	6	11	13	11	13
Average	2	3	3	2	2	2	1	2	3	2	3

3 – Strong, 2- Medium, 1- Low

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAC32P	**Programming in Java Lab**	Practical-IV	0	0	4	0	2	4	25	75	100

Learning Objectives

LO1	To provide fundamental knowledge of object-oriented programming.
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to know about Event Handling.
LO4	To enable the students to use String Concepts.
LO5	To equip the student with programming knowledge in to create GUI using AWT controls.

Unit	Content	Hours
1	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer	
2	Write a Java program to multiply two given matrices.	
3	Write a Java program that displays the number of characters, lines and words in a text	
4	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.	
5	Write a program to do String Manipulation using Character Array and perform the following string operations: a. String length b. Finding a character at a particular position	
6	Write a program to perform the following string operations using String class: a. String Concatenation b. Search a substring	
7	Write a program to perform string operations using String Buffer class: a. Length of a string b. Reverse a string c. Delete a substring from the given string	60
8	Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.	
9	Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.	
10	Write a program to demonstrate the use of following exceptions. a. Arithmetic Exception b. Number Format Exception	
11	Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes	
12	Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.	
13	Write a Java program that handles all mouse events and shows the event name at the	

	center of the window when a mouse event is fired. (Use adapter classes).	
14	Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.	
15	Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.	

CO	Course Outcomes-On completion of this course, students will be
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.
CO3	Implement multi-threading and I/O Streams of Core Java
CO4	Implement AWT and Event handling.
CO5	Use Swing to create GUI.

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2	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999
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4	"Java Programming for Beginners" – Mark Lassoff, LearnToProgram Media
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4	"Java Network Programming" (4th Edition) Elliotte Rusty Harold, O'Reilly Media
5	"Java Performance: The Definitive Guide", Scott Oaks, O'Reilly Media

Web resources:	
1	https://javabeginnerstutorial.com/core-java-tutorial
2	http://docs.oracle.com/javase/tutorial/
3	https://www.coursera.org/
4	https://docs.oracle.com/en/java/
5	https://www.programiz.com/java-programming

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	2	1	2	3	1	2
CO2	3	3	3	2	2	2	1	2	3	2	3
CO3	2	3	3	3	2	1	2	3	2	3	3
CO4	2	2	3	2	2	1	1	3	2	2	2
CO5	2	3	3	3	3	2	1	3	3	3	3
Total	12	13	15	12	10	8	6	13	13	11	13
Average	2	3	3	2	2	2	1	3	3	2	3

3 – Strong, 2- Medium, 1- low

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks CIA	Marks External	Marks Total
24UCAE31	Web Technology	Elective -IV	3	1	0	0	4	4	25	75	100

	Learning Objectives
LO1	Understand the basic concepts of the Internet, web technologies, and client-server architecture.
LO2	Learn the structure and syntax of HTML and CSS for creating and styling web pages.
LO3	Develop interactivity using client-side scripting languages like JavaScript.
LO4	Gain knowledge of server-side programming concepts using PHP (or similar).
LO5	Learn to define custom tags, attributes, and elements using XML and purpose of XML in web technologies.

Unit	Content	Hours
1	**Introduction to Internet and Web Technologies:** History and evolution of the Internet and World Wide Web, Understanding URLs, web pages, and web browsers. **Overview of web protocols:** HTTP, FTP, SMTP, etc, Client-server architecture and web server basics, Search engines and their functionalities.	12
2	**HTML and CSS:** HTML basics: tags, elements, attributes, and document structure, Creating forms, tables, and lists in HTML. **Introduction to Cascading Style Sheets (CSS)**, CSS Basics: Syntax, Comments, Selectors, Declarations, Types and Comments, Linking Style Sheet to HTML. Creating CSS File. CSS Box Model.	12
3	**Client-Side Scripting with JavaScript:** JavaScript syntax and data types, Variables, operators, and control structures, Functions and event handling, Form validation techniques. Introduction to Document Object Model (DOM) manipulation.	12
4	**Server-Side Scripting (e.g., PHP):** Basics of server-side scripting languages, Handling form data on the server, Session management and cookies, Connecting to databases and performing CRUD operations, Security considerations in server-side scripting.	12
5	**XML:** Introduction to XML, XML Specification , XML Syntax, Defining XML tags, their attributes and values, Structure of XML, XML Elements, Naming Rules XML Element Content Models, XML DTD (Document Type Declaration), XML Schema.	12

CO	Course Outcomes- On completion of this course, students will be
CO1	Describe the functioning of the Internet, web protocols, and client-server model.
CO2	Design structured and visually styled web pages using HTML and CSS.
CO3	Implement interactive features in web pages using JavaScript.
CO4	Develop dynamic websites with server-side scripting and database connectivity.
CO5	Design XML documents with appropriate elements, attributes, and hierarchical structure.

Textbooks:

1	Thomas A. Powell: HTML & XHTML"Fourth Edition, The Complete Reference
2	Ivan Bay ross:Web enabled commercial application development using HTML,JavaScript,DHTMLandPHP"4th Edition
3	Robert W.Sebesta: Programming the World WideWeb,Eighth Edition, Pearson education,2015.
4	Dayley Brad, Dayley Brendan,"AngularJS,JavaScript,and jQuery All in One",Sams Teach Yourself 1st Edition,Kindle Edition,2015.
5	Deitel,nieto,Lin,Sandhu-"XML How to program"-Pearson.

Reference Books:

1	M. Srinivasan:Web Programming Building Internet Applications,3rd Edition,Wiley India,2009.
2	JeffreyC.Jackson:Web Technologies-A Computer Science Perspective, Pearson Education,7th Impression,2012.
3	Chris Bates: Web Technology Theory and Practice,Pearson Education,2012.
4	Raj Kamal: Internet and Web Technologies, McGraw Hill Education.
5	Ryan Benedetti, Ronan Cranley, Head First jQuery- A Brain-Friendly Guide,O'ReillyMedia

Web resources:

1	https://www.studocu.com/in/document/mangalore-university/web-technology/unit-1-part-a/92991233/
2	https://www.studocu.com/in/document/anna-university/web-technologies/wt-unit-ii-web-technologies-notes/102028957/download/wt-unit-ii-web-technologies-notes.pdf/
3	https://www.studocu.com/in/document/anna-university/internet-programming/unit-iii-server-side-programming-final/92812518/download/unit-iii-server-side-programming-final.pdf/
4	https://www.studocu.com/in/document/anna-university/internet-programming/cs8651-ip-notes-unit-4/41046757/
5	https://www.studocu.com/in/document/anna-university/web-technology/unit-v-introduction-to-angular-and-web-applications-frameworks/67820610

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	2	1	2	3	1	2
CO2	3	3	3	2	2	2	2	2	3	2	3
CO3	2	3	3	3	2	1	2	3	2	3	3
CO4	2	2	3	2	3	2	1	3	2	2	3
CO5	2	3	3	3	3	1	2	3	3	3	3
Total	12	13	15	12	11	8	8	13	13	11	14
Average	2	3	3	2	2	2	2	3	3	2	3

3 – Strong, 2- Medium, 1- Low

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAE33P	**Web Technology Lab**	**Practical-V**	0	0	2	0	2	2	25	75	100

Learning Objectives	
LO1	To understand the concepts of ADTs
LO2	To learn linear data structures-lists, stacks, queues
LO3	To learn Tree structures and application of trees
LO4	To learn graph structures and application of graphs
LO5	To understand various sorting and searching

Unit	Content	Hours
1	Create a web page having suitable background color and text color with title "My First Web Page" using all the attributes of the Font tag.	20
2	Create a web page with Frames and Tables	
3	Create HTML for demonstration of cascading style sheets. A. Embedded style sheets. B. External style sheets. C. Inline styles.	
4	Create a personal portfolio web page Using HTML for structure and CSS for styling.	
5	Writing scripts for form validation using JavaScript. Example: Check if email, phone number, and password fields are correctly filled.	
6	Build a simple calculator using JavaScript.	
7	Create a PHP program to check whether given number is String palindrome or not.	
8	Create a simple dynamic web page using PHP. Accept form data and display output (e.g., feedback form processing).	
9	Create an external Document Type Definition to validate XML for CUSTOMER DETAILS.	
10	Design an XML document and validate it using XML Schema.	

CO	Course Outcomes
CO1	Construct a basic web site using HTML and Cascading Style Sheets
CO2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
CO3	Develop server side programs using Servlets and JSP.
CO4	Construct simple web pages in PHP and to represent data in XML format.
CO5	Develop interactive web applications.

Textbooks:

1	Deitel and Deitel and Nieto,Internet and World Wide Web-How to Program, Prentice Hall, 5th Edition, 2011.
2	Jeffrey C and Jackson,Web Technologies A Computer Science Perspective,Pearson Education, 2011.
3	Angular 6 for Enterprise-Ready Web Applications,Doguhan Uluca,1stedition,Packt Publishing

Reference Books:

1	Stephen Wynkoop and John Burke"Running a Perfect Website",QUE,2nd Edition,1999.
2	Chris Bates,Web Programming–Building Intranet Applications,3rd Edition,Wiley Publications, 2009.
3	Gopalan N.P.and Akil and eswari J.,"Web Technology",Prentice Hall of India,2011.
4	Uttam K.Roy,"Web Technologies",Oxford University Press,2011.
5	Angular: Up and Running: Learning Angular,Step by Step,Shyam Seshadri,1st edition,O 'Reilly

Web resources:

1	https://mrcet.com/pdf/Lab%20Manuals/WT%20LAB%20MANUAL.pdf
2	https://www.studocu.com/in/document/anna-university/web-technologies/wt-unit-ii-web-technologies-notes/102028957/download/wt-unit-ii-web-technologies-notes.pdf
3	https://www.studocu.com/in/document/anna-university/internet-programming/unit-iii-server-side-programming-final/92812518/download/unit-iii-server-side-programming-final.pdf
4	https://www.studocu.com/in/document/anna-university/internet-programming/cs8651-ip-notes-unit-4/41046757
5	https://www.studocu.com/in/document/anna-university/web-technology/unit-v-introduction-to-angular-and-web-applications-frameworks/67820610

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	1	2	2	3	1	2
CO2	3	3	3	2	2	2	2	2	3	2	3
CO3	2	3	3	3	2	1	1	3	2	3	3
CO4	2	2	3	2	3	2	2	3	2	2	3
CO5	2	3	3	3	3	3	2	3	3	3	3
Total	12	13	15	12	11	9	9	13	13	11	14
Average	2	3	3	2	2	2	2	3	3	2	3

3 – Strong, 2- Medium, 1- low

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAE32	**Open Source Software**	Elective- IV	3	1	0	0	4	4	**25**	**75**	**100**

	Learning Objectives	
LO1	Understand the basic structure and functionality of HTML and HTML5.and also Applies CSS for styling web pages, including layout, colors and fonts.	
LO2	Understand essential Linux commands for system navigation and management.	
LO3	To Learn about the fundamentals of JavaScript and MySQL.	
LO4	Learn the fundamentals of PHP and its syntax.	
LO5	To Learn the fundamentals and background of Perl.	

Unit	Content	Hours
1	**Unit-1:INTRODUCTION TO HTML, HTML5, CSS:** Need and Applications of Open Source -Introduction to HTML-HTML Tags and Structure-Dynamic Web Content -Introduction to HTML5-HTML5 Canvas-HTML5 Audio and Video-Introduction to CSS-CSS Rules and Selectors-CSS Style Types and Colors	12
2	**Unit-2:LINUX:** Linux Essential Commands-Kernel Model and User Mode-File System Concepts-The Linux Security Model-Vi Editor Basics-Shell Introduction--Managing Processes -Installing Applications in Linux	12
3	**Unit-3:JAVASCRIPT AND MYSQL**: JavaScript: Introduction of JavaScript - JavaScript Syntax-Data Types and Variables-Arrays-Operators and Expressions-Loops-Functions-Dialog Boxes **MySQL:**Introduction to MySQL-SHOW Databases and Tables-USE Command-Creating Databases and Tables-Describing Tables-SELECT, INSERT, UPDATE, and DELETE Statements	12
4	**Unit-4:PHP:**Introduction to PHP-PHP Syntax and Scripting- -PHP Variables, Operations, and Expressions-Control Statements -Basic Form Processing-File and Folder Access-Cookies and Sessions-Database Access with PHP	12
5	**Unit 5 PERL:** Introduction to Perl and Its Background-Perl Features-Perl Parsing Rules-Variables and Data Types-Statements and Control Structures-Subroutines, Packages, and Modules-Working with Files in Perl-Data Manipulation in Perl	12

CO	Course Outcomes- On completion of this course, students will be
CO1	To Understand about the Design structured web pages using HTML and HTML5.Create responsive designs using CSS techniques.
CO2	Apply knowledge of the Linux file system for system organization.
CO3	Implement JavaScript-based dynamic content with MySQL databases.
CO4	Implement PHP operations, expressions, and control structures.
CO5	Understand about basic conceptof PERL

Text books:

1	"The Complete Reference Linux", Peterson, Tata McGrawHILL–2010
2	"Perl: The Complete Reference", Martin C. Brown, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2009.
3	"MYSQL: The Complete Reference", Vikram Vaswani, 2nd Edition, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2009
4	"PHP: The Complete Reference", Steven Holzner, 2nd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
5	"Complete Reference HTML", T.A. Powell,3rd Edition, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2002.

Reference Books:

1	"Fundamentals of Open Source Software", by M. N. Rao, PHI publishers.
2	"MySQLBible", Steve Suchring, JohnWiley,2002
3	"The Linux Kernel Book", Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4	Ivan By Ross, HTML, DHTML, Javascript, Perl, BPB Publication, "PHP: The Complete Reference" – Steven Holzner
5	" Learning Perl" – Randal L. Schwartz, Tom Phoenix, Brian D. Foy,"Programming Perl" – Larry Wall, Tom Christiansen, Jon Orwant,"Perl Cookbook" – Tom Christiansen, Nathan Torkington

Web resources:

1	https://www.w3schools.com/html/,https://www.w3schools.com/css/
2	https://www.geeksforgeeks.org/linux-tutorial/
3	https://developer.mozilla.org/en-US/docs/Web/JavaScript,https://www.w3schools.com/MySQL/default.asp
4	https://www.w3schools.com/php/
5	https://www.tutorialspoint.com/perl/index.htm

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	1	2
CO2	2	3	3	2	3	1	2	2	3	2	3
CO3	2	3	3	3	2	2	2	3	3	2	2
CO4	2	2	3	3	2	3	3	3	3	3	3
CO5	2	3	3	3	3	2	2	3	3	3	3
Total	11	13	14	13	12	10	11	13	14	11	13
Average	2	3	3	3	2	2	2	3	3	2	3

3 – Strong, 2- Medium, 1- Low

2nd YEAR: THIRD SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAE34P	**Open Source Software Lab**	**Practical- V**	**0**	**0**	**2**	**0**	**2**	**2**	**25**	**75**	**100**

	Learning Objectives
LO1	To understand the basic HTMLTags.
LO2	To understand the types of CSS.
LO3	To learn Javascript functions.
LO4	To know about PHP form elements.
LO5	To learn PHP with MYSQL database connectivity.

Unit	Content	Hours
1	Create a web page with Frames and Tables.	
2	Create a webpage in Corporating CSS(Cascading Style Sheets).	
3	Develop a shell program to find the factorial of an integer positive number.	
4	Develop a shell program to find the details of a user session.	
5	Create a simple calculator in JavaScript	
6	Develop a JavaScript program to scroll your name in the scrollbar.	20
7	Develop a program and check message passing mechanism between pages	
8	Application for Email Registration and Login using PHP and MySQL.	
9	Program to Create a File and write the Data into it using PHP	
10	Program to perform the String Operation using Perl	

CO	Course Outcomes- On completion of this course, students will be
CO1	The student will be able to design static web pages.
CO2	The student will be able to link common style to the web pages using CSS.
CO3	The student will be able to validate form controls using javascript.
CO4	The student will be able to design dynamic web pages using tags.
CO5	The student will be able to develop PHP program with MYSQL database connection.

Textbooks:

1	"The Complete Reference Linux", Peterson, Tata McGrawHILL–2010
2	"Perl: The Complete Reference", Martin C. Brown, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2009.
3	"MYSQL: The Complete Reference", Vikram Vaswani, 2nd Edition, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2009
4	"PHP: The Complete Reference", Steven Holzner, 2nd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
5	"Complete Reference HTML", T.A. Powell,3rd Edition, Tata Mc Graw Hill Publishing Company Limited, Indian Reprint 2002.

Reference Books:

1	"Fundamentals of Open Source Software", by M. N. Rao, PHI publishers.
2	"MySQLBible", Steve Suchring, JohnWiley,2002
3	"The Linux Kernel Book", Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4	Ivan By Ross, HTML, DHTML, Javascript, Perl, BPB Publication, "PHP: The Complete Reference" – Steven Holzner
5	" Learning Perl" – Randal L. Schwartz, Tom Phoenix, Brian D. Foy,"Programming Perl" – Larry Wall, Tom Christiansen, Jon Orwant,"Perl Cookbook" – Tom Christiansen, Nathan Torkington

Web resources:

1	https://www.w3schools.com/html/,https://www.w3schools.com/css/
2	https://www.geeksforgeeks.org/linux-tutorial/
3	https://developer.mozilla.org/en-US/docs/Web/JavaScript,https://www.w3schools.com/MySQL/default.asp
4	https://www.w3schools.com/php/
5	https://www.tutorialspoint.com/perl/index.html/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	-	2	-	2	3	2	2
CO2	2	2	-	3	-	2	-	2	2	2	3
CO3	2	2	2	3	2	2	2	-	2	2	3
CO4	3	3	3	3	-	3	3	2	3	3	3
CO5	2	3	3	3	3	2	3	2	3	3	3
Total	12	12	10	15	5	11	8	8	13	12	14
Average	2	2	2	3	1	2	2	2	3	2	3

3 – Strong, 2- Medium, 1- low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAS31	Multimedia Systems	SEC-IV	1	0	1	0	2	2	25	75	100

	Learning Objectives
LO1	Understand the fundamental concepts of multimedia and its various components.
LO2	Explore tools and techniques for an integrating multimedia elements such as text, images, audio, video, and animation.
LO3	Apply design principles to develop multimedia content for practical applications .
LO4	Gain hands-on experience with industry-standard multimedia software.
LO5	Understanding the concept of cost involved in multimedia, planning, designing, and producing.

Unit	Content	Hours
1	**Introduction to Multimedia:** Definition and elements of multimedia, Types of multimedia : Linear vs. Non-linear, Multimedia applications (education, entertainment, business), Multimedia system architecture and requirements.	6
2	**Text and Image in Multimedia:** Types of text and fonts, Image file formats: BMP, JPEG, PNG, GIF. Basics of image editing: cropping, resizing, layers. Tools: Adobe Photoshop / GIMP.	6
3	**Audio and Video Technology:** Characteristics of sound: frequency, amplitude. Audio file formats: WAV, MP3, OGG. Basics of video: frame rate, resolution, aspect ratio.Video formats: AVI, MP4, MOV. Tools: Audacity (audio), Adobe Premiere Pro / Shotcut (video).	6
4	**Animation in Multimedia:** Principles of animation (keyframes, tweening, morphing). Types: 2D vs. 3D animation. Animation tools: Adobe Animate / Blender. Applications of animation: advertising, web, games.	6
5	**Multimedia Authoring and Tools:** Types of authoring tools: Icon-based, Time-based, Card-based. Multimedia project planning and design. Integrating text, images, audio, and video. Building multimedia presentations (e.g., in Adobe Flash, PowerPoint).	6

CO	Course Outcomes- On completion of this course, students will be
CO1	Understand the concepts, importance, application and the process of developing multimedia
CO2	To have basic knowledge and understanding about Image related processing's
CO3	To understand the framework of frames and bit Images to animations
CO4	Speaks about the multimedia projects and stages of Requirement in phases of project
CO5	Understanding the concept of cost involved in multimedia planning, designing, and producing.

Text books:

1	TayVaughan,"Multimedia:MakingItWork",8thEdition,Osborne/McGraw-Hill, 2001.
2	Fundamentals of multimedia Book by Ze-Nian Li, 2004
3	Introduction to Multimedia and its Applications, V.K.Jain, Khanna Publishing House,2012

Reference Books:

1	Ralf Steinmetz & Klara Nahrstedt"Multimedia Computing, Communication& Applications", Pearson Education, 2012.

Web resources:

1	https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/
2	https://www.geeksforgeeks.org/multimedia-tutorial/
3	https://www.javatpoint.com/Planning/-tutorial
4	https://www.tutorialspoint.com/Designing and producing/index.html
5	https://www.tutorialspoint.com/software needs/.html

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	-	2	2	2	2	-
CO2	2	2	2	3	2	2	1	2	3	2	2
CO3	2	2	3	3	2	2	1	3	2	-	3
CO4	2	2	3	3	2	3	2	3	3	2	3
CO5	2	2	3	3	2	2	3	3	3	3	3
Total	11	10	13	14	11	9	9	13	13	9	11
Average	2	2	3	3	2	2	2	3	3	2	2

3 – Strong, 2- Medium, 1- low

2nd YEAR: FOURTH SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAC41	**Python Programming**	Core	3	1	2	0	5	6	25	75	100

	Learning Objectives
LO1	To understand the basic building blocks for PYTHON programming.
LO2	To Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
LO3	To understand the concept of arrays and their role in storing collections of data.
LO4	To perform list creation and use list elements through indexing and iteration.
LO5	To understand the objects in Python, including creating object instances and accessing attributes and methods.

Unit	Content	Hours
1	**Unit-1: INTRODUCTION** Identifiers – Keywords - Statements and Expressions – Variables – Operators – Arithmetic operators – Assignment operators – Comparison operators – Logical operators – Bitwise operators - Precedence and Associativity – Data types - Number – Booleans – Strings - Indentation – Comments – Single line comment – Multiline comments - Reading Input – Print Output – Type Conversions – int function – float function – str() function – chr() function – complex() function – ord() function – hex() function – oct() function - type() function and Is operator – Dynamic and Strongly typed language.	**15**
2	**Unit-2: CONTROL FLOW STATEMENTS** Control Flow Statements – If statement – If else statement – If elif else statement – nested if statement - while loop – for loop – continue and break statements – catching exceptions using try and except statement – syntax errors – exceptions – exception handling – Strings – str() function - Basic string operations – String comparison – Built in functions using strings – Accessing characters in string – String slicing – String joining – split() method – string traversing.	**13**
3	**Unit-3:ARRAYS AND FUNCTIONS** Arrays-Types-Functions – Built in functions – function definition and calling - return statement – void function – scope and lifetime of variables – args and kwargs – command line arguments - Tuples – creation – basic tuple operations – tuple() function – indexing – slicing – built-in functions used on tuples – tuple methods – packing – unpacking – traversing of tuples – populating tuples – zip() function - Sets – Traversing of sets – set methods – frozenset.	**15**
4	**Unit-4: LISTS** Using List- List Assignment and Equivalence – List Bounds- Slicing - Lists and Functions- Prime Generation with a List. List Processing: Sorting-Flexible Sorting- Search- List Permutations- Randomly Permuting a List- Reversing a List. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods Difference between Lists and Dictionaries.	**13**

| 5 | **Unit-5: OBJECTS**
Using Objects- String Objects- List Objects. Custom Types: Geometric Points- Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- Exception Examples- Using Exceptions - Custom Exceptions. | **14** |

CO	**Course Outcomes- On completion of this course, students will be**
CO1	To understand the basic building blocks for creating PYTHON programming in details.
CO2	To understand the control statements and basic methods used in PYTHON programming
CO3	To understand and apply the concepts of arrays, functions, tuples, and sets to store, access, and manipulate data efficiently.
CO4	To manage key-value data structures using dictionaries and differentiate between lists and dictionaries based on structure, access method, and application.
CO5	To effectively by using exception handling mechanisms and design custom exceptions for robust and safe program execution.
Textbooks:	
1	Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis.
2	Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University.
3	Reema Thareja, ―Python Programming using problem solving approach, First Edition, 2017, Oxford University Press.
4	Dr. R. Nageswara Rao, ―Core Python Programming , First Edition, 2017, Dream tech Publishers.
Reference Books:	
1	Core Python Programming, 2nd Edition, Wesley J. Chun, Prentice Hall.
2	Jake VanderPlas," Python Data Science Handbook: Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.
3	Adam Stewarts, "Python Programming", Online.
4	Fabio Nelli, "Python Data Analytics", A Press.
5	KennethA. Lambert, ―Fundamentals of Python–First Programs, CENGAGE Publication.
Web resources:	
1	https://www.programiz.com/python-programming
2	https://www.guru99.com/python-tutorials.html
3	https://www.w3schools.com/python/python_intro.asp
4	https://www.geeksforgeeks.org/python-programming-language/
5	https://wiki.python.org/moin/BeginnersGuide/Programmers

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	3	2	2	3	2	3	3	1	1	2
CO2	2	2	2	2	3	2	3	3	2	2	3
CO3	2	3	3	3	3	2	2	3	3	3	3
CO4	3	3	3	1	3	3	3	3	3	2	2
CO5	3	2	3	2	3	3	3	3	2	3	3
Total	12	13	13	10	15	12	14	15	11	11	13
Average	**2**	**2.6**	**2.6**	**2**	**3**	**2**	**2.8**	**3**	**2**	2	3

3 – Strong, 2- Medium, 1- Low

2nd YEAR: FOURTH SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	CIA	External	Total
									Marks		
24UCAC42P	**Python Programming Lab**	Practical-IV	0	0	4	0	2	4	25	75	100

**Learning Objectives**
LO1	To understand and use various operators (arithmetic, relational, logical, and bitwise) to perform operations on variables and string operation in Python.
LO2	To apply conditional statements to make decisions based on input values (e.g., check odd or even numbers) and list operations.
LO3	To use functions to compute results such as the sum of elements in an array, promoting modular programming.
LO4	To define and create classes and objects, illustrating object-oriented programming concepts such as attributes and encapsulation.
LO5	To handle the multiple exceptions in Python to ensure robust and error-free file handling.

Unit	Content	Hours
1	Write a Python program to demonstrate the use of various operators (arithmetic, relational, logical, bitwise) on variables.	40
2	Write a Python program to perform the string operations.	
3	Write a Python program to input a number and check whether it is odd or even using an if-else conditional statement.	
4	Write a Python program to demonstrate list operations like insertion, deletion, slicing, and concatenation.	
5	Develop a Python program to find the largest element in the array.	
6	Develop a Python program to find the sum of the elements in an array with functions	
7	Develop a Python program to store strings in a list and print them.	
8	Develop a Python program to find the length of a list, reverse it, copy it and then clear it.	
9	Write a Python program to define a Student class with attributes name, age, and grade. Create objects of this class and display their details.	
10	Develop a Python Program to read file with multiple Exceptions	

CO	Course Outcomes-On completion of this course, students will be
CO1	To apply Python operators and expressions to solve basic computational problems.
CO2	To perform string and list operations to manipulate data effectively.
CO3	To implement decision-making and control flow using conditional statements.
CO4	To use arrays/lists and functions to compute values such as largest element and sum of elements.
CO5	To demonstrate understanding of object-oriented programming by defining classes and creating objects.

Textbooks:	
1	Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis.
2	Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University.
3	Reema Thareja, ―Python Programming using problem solving approach, First Edition, 2017, Oxford University Press.
4	Dr. R. Nageswara Rao, ―Core Python Programming , First Edition, 2017, Dream tech Publishers.

Reference Books:	
1	Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.
2	Jake VanderPlas," Python Data Science Handbook: Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.
3	Adam Stewarts, "Python Programming", Online.
4	Fabio Nelli, "Python Data Analytics", A Press.
5	KennethA. Lambert, ―Fundamentals of Python–First Programs, CENGAGE Publication.

Web resources:	
1	https://www.programiz.com/python-programming
2	https://www.guru99.com/python-tutorials.html
3	https://www.w3schools.com/python/python_intro.asp
4	https://www.geeksforgeeks.org/python-programming-language/
5	https://www.geeksforgeeks.org/python-programming-language/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	2	1	2	3	1	2
CO2	3	3	3	2	2	2	1	2	3	2	3
CO3	2	3	3	3	2	1	2	3	2	3	3
CO4	2	2	3	2	2	1	1	3	2	2	2
CO5	2	3	3	3	3	2	1	3	3	3	3
Total	12	13	15	12	10	8	6	13	13	11	13
Average	2	3	3	2	2	2	1	3	3	2	3

3 – Strong, 2- Medium, 1- low

2nd YEAR: FOURTH SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks CIA	Marks External	Total
24UCAA41	**Relational Database Management System**	Elective -VI	3	1	0	0	4	4	25	75	100

	Learning Objectives
LO1	To understand database concepts and database management system software and have a high-level understanding of major DBMS components and their function.
LO2	To understand the E R model and relational model.
LO3	To describe and apply the steps of the normalization process, including 1NF, 2NF, 3NF, and BCNF.
LO4	To Use **SQL Data Definition Language (DDL)** commands to create, alter, and drop database objects and perform **Data Manipulation Language (DML)** operations such as inserting, updating, deleting, and retrieving data.
LO5	To understand **PL/SQL block structure**, variables, data types, and assignment statements.

Unit	Content	Hours
1	**Database Concepts:** Database Systems- Data vs Information-History of database systems -Introducing the database- Data vs Information-Database architecture - File system - Problems with file system – Database systems. Data models - Importance - Basic Building Blocks - Business rules - Evolution of Data models - Degrees of Data Abstraction.	12
2	**Design Concepts:** Relational database model - logical view of data-keys - Integrity rules - relational set operators-Relational Languages: Relational Algebra, The Tuple Relational Calculus - The Domain Relational Calculus - data dictionary and the system catalog - relationships -data redundancy revisited - indexes - codd's rules. Entity relationship model - ER diagram	12
3	**Normalization of Database Tables**: Database tables and Normalization – The Need for Normalization –The Normalization Process – Higher level Normal Form. **Introduction to SQL**: Data Definition Commands – Data Manipulation Commands – SELECT Queries – Additional Data Definition Commands – Additional SELECT Query Keywords – Joining Database Tables.	12
4	**Advanced SQL**: Relational SET Operators: UNION – UNION ALL – INTERSECT - MINUS. SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join. **Sub Queries and Correlated Queries**: WHERE – IN – HAVING – ANY and ALL – FROM. SQL Functions: Date and Time Function – Numeric Function – String Function – Conversion Function	12
5	**PL/SQL**:A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Variable Declaration – Assignment operation –Arithmetic operators. **Control Structures and Embedded SQL**: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. **PL/SQL Cursors and Exceptions**: Cursors – Implicit Cursors, Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	12

CO	Course Outcomes- On completion of this course, students will be
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity- Relationship Model.
CO3	Analyze and normalize database tables to eliminate anomalies and improve data consistency.
CO4	Apply SQL functions and write efficient subqueries and correlated queries for advanced data handling.
CO5	Use cursors and exception handlers to process multiple records and manage runtime errors effectively in PL/SQL applications.

Textbooks:

1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition
2	Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Publications
3	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.
4	An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition.
5	Database Design and Modeling with PostgreSQL and MySQL (2024) — Alkin Tezuysal, Ibrar Ahmed & Peter Zaitsev

Reference Books:

1	Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database System Concepts", Seventh Edition, TMH.
2	The Relational Model for Database Management Version 2 – A Critical Analysis (2024) — Chris Date
3	Mastering SQL Server Database Administration (2024) — Michael E. Kirshteyn, Ph.D.
4	An Introduction to Database Systems — *Christopher J. Date*, currently in its 8th Edition

Web resources:

1	DBMS Tutorial – Learn Database Management System - GeeksforGeeks
2	https://www.tutorialspoint.com/dbms/index.htm
3	nptel.ac.in/courses/106105175
4	https://www.w3schools.com/sql/

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	3	2	3	3	2
CO2	3	2	3	3	3	3	2	3	2	3	3
CO3	3	3	2	3	3	3	3	3	3	2	3
CO4	3	2	3	3	2	3	3	2	2	3	2
CO5	3	2	3	2	3	3	2	3	3	3	3
Total	15	12	13	14	14	14	13	13	13	14	13
Average	3	2.4	2.6	2.8	2.8	2.8	2.6	2.6	2.6	2.8	2.8

3 – Strong, 2- Medium, 1- Low

2nd YEAR: FOURTH SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	CIA	External	Total
									Marks		
24UCAA41P	**Relational Database Management System Lab**	**Practical-VII**	0	0	2	0	2	2	25	75	100

Learning Objectives	
LO1	Learn how to connect and disconnect from a database environment.
LO2	Analyze the real-world problem to identify entities, attributes, and relationships.
LO3	Learn syntax and usage of SQL DDL (CREATE, ALTER, DROP) and DML (INSERT, UPDATE, DELETE, SELECT).
LO4	Understand relational joins and their purpose in combining data from multiple tables.
LO5	Integrate conceptual, logical, and physical design concepts.

Unit	Content	Hours
1	Creating users, connecting to databases, and understanding schema.	
2	Define tables using **appropriate data types and constraints** (PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK).	
3	Draw an ER diagram to Library management System.	
4	Draw an ER diagram to University Database.	
5	Give exercise on DDL and DML	
6	Use **aggregate functions** (SUM, AVG, COUNT, MIN, MAX).	20
7	Implement **INNER JOIN**, **OUTER JOIN (LEFT, RIGHT)**	
8	Write queries using **IN**, **ANY**, **ALL**, and **EXISTS** operators.	
9	Write a PL/SQL block to fetch records using **CURSOR FOR LOOP**	
10	Design and implement a **complete database system** for Library Management System	

CO	Course Outcomes
CO1	Design and create database tables using proper data types and constraints to ensure data integrity.
CO2	Create ER diagrams for institutional databases demonstrating correct data relationships.
CO3	Apply aggregate and grouping functions to generate summarized data reports.
CO4	Write and execute subqueries with conditional operators to handle complex query requirements.
CO5	Design, build, and demonstrate a functional relational database project integrating all learned DBMS concepts.
Textbooks:	
1	Pranab Kumar Das Gupta and P. Radha Krishnan, "Database Management System Oracle SQL and PL/SQL", Second Edition, 2013, PHI Learning Private Limited.
2	Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Publications
3	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.
Reference Books:	
1	Abraham Silberschatz, Henry Korth, S. Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010. 2. Raghu Ramakrishnan and Johannes Gehrke, Database management systems, Third Edition,2002.
2	The Relational Model for Database Management Version 2 – A Critical Analysis (2024) — Chris Date
3	Mastering SQL Server Database Administration (2024) — Michael E. Kirshteyn, Ph.D.
4	An Introduction to Database Systems — *Christopher J. Date*, currently in its 8th Edition
5	The Relational Model for Database Management Version 2 – A Critical Analysis (2024) — Chris Date
Web resources:	
1	DBMS Tutorial – Learn Database Management System - GeeksforGeeks
2	https://www.tutorialspoint.com/dbms/index.htm
3	nptel.ac.in/courses/106105175
4	https://www.w3schools.com/sql/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	1	2	2	3	1	2
CO2	3	3	3	2	2	2	2	2	3	2	3
CO3	2	3	3	3	2	1	1	3	2	3	3
CO4	2	2	3	2	3	2	2	3	2	2	3
CO5	2	3	3	3	3	3	2	3	3	3	3
Total	12	13	15	12	11	9	9	13	13	11	14
Average	2	3	3	2	2	2	2	3	3	2	3

3 – Strong, 2- Medium, 1- low

2nd YEAR: FOURTH SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	CIA	External	Total
									Marks		
24UCAA42	**Computer Graphics**	**Elective -VI**	3	1	0	0	4	4	25	75	100

Learning Objectives

LO1	To understand the concept of interactive computer graphics and its advantages.
LO2	To explain and apply clipping techniques for points, lines, and polygons.
LO3	To understand and apply 2D transformations such as translation, rotation, scaling, reflection, and shearing.
LO4	To understand and apply spline curves for shape and surface representation.
LO5	To understand keyframing, morphing, and motion specification techniques.

Unit	Content	Hours
1	Introduction: Interactive Computer Graphics, Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Conceptual Framework for Interactive Graphics, Classification of Application Development of Hardware and software for computer Graphics.	12
2	Scan Conversion: Scan Converting Lines, Scan Converting Circles, Scan Converting Ellipses. Clipping: point clipping, Cohen-Sutherland line clipping Algorithm, Midpoint Subdivision Algorithm, polygon clipping (Sutherland-Hodgeman)	12
3	Geometrical Transformation: 2D Transformation (translation, rotation, scaling, reflection and shearing), Homogeneous Coordinates and Matrix Representation of 2D Transformations, Successive and composite 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.	12
4	Curves & Surfaces: Polygon Surfaces and polygon meshes, Quadratic and super quadrics surfaces, Spline curve and representation.	12
5	Computer Animation: introduction, Application of animation, Morphing, Keyframe system, Motion specifications in Animation, Types of animation, Sequencing of Animation Design and Fundamental principles of animation.	12

CO	Course Outcomes- On completion of this course, students will be
CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO3	Use of geometric transformations on graphics objects and their application in composite form.
CO4	Represent objects using polygon meshes, spline curves, and quadric surfaces effectively.
CO5	Design and demonstrate basic animation sequences using keyframing, morphing, and motion techniques along with animation principles.

Textbooks:

1	Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000
2	D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment& Frame work, 2000
3	Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
4	D. Haran & Baker. Computer Graphics Prentice Hall of India,1986.
5	D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008

Reference Books:

1	Donald Hearn, M. Pauline Baker, Warren R. Carithers, Computer Graphics with OpenGL, Pearson / 4th Edition
2	Kommaraju S. Raghavendra, Computer Graphics, XiTech Publications / Latest Edition
3	Neumann, Sproull, Introduction to Computer Graphics, Addison-Wesley
4	Peter Shirley, Fundamentals of Computer Graphics, CRC Press / 4th Edition

Web resources:

1	https://www.javatpoint.com/computer-graphics-tutorial
2	https://nptel.ac.in/courses/106/106/106106090/
3	https://www.programiz.com/computer-graphics
4	https://nptel.ac.in/courses/106/102/106102157/

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	3	2	3	3	2
CO2	3	2	3	3	3	3	2	3	2	3	3
CO3	3	3	2	3	3	3	3	3	3	2	3
CO4	3	2	3	3	2	3	3	2	2	3	2
CO5	3	2	3	2	3	3	2	3	3	3	3
Total	15	12	13	14	14	14	13	13	13	14	13
Average	3	2.4	2.6	2.8	2.8	2.8	2.6	2.6	2.6	2.8	2.8

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAA42P	**Computer Graphics Lab**	**Practical-VII**	**0**	**0**	**2**	**0**	**2**	**2**	**25**	**75**	**100**

Learning Objectives	
LO1	Understand the basic structure of a graphics program.
LO2	Implement DDA algorithm using incremental calculation
LO3	Understand the concept of mapping world coordinates to screen coordinates.
LO4	Learn about polygonal surface representation and mesh structures.
LO5	Integrate multiple graphics concepts (drawing, transformation, animation).

Unit	Content	Hours
1	Define the Setup and run a basic graphics program (using graphics.h, OpenGL, or Pygame).	
2	Write a program to draw and color simple 2D shapes (line, triangle, rectangle, circle, ellipse).	
3	To implement the DDA (Digital Differential Analyzer) line drawing algorithm.	
4	Write a program to Implement Cohen–Sutherland Line Clipping Algorithm.	
5	To implement 2D Translation, Scaling, and Rotation of objects.	
6	To demonstrate window-to-viewport mapping for a given object and display area.	20
7	Write a program to implement Bezier Curve generation using control points.	
8	Represent and display simple polygon meshes (cube, pyramid).	
9	Implement morphing between two 2D shapes.	
10	Develop a small animation combining learned concepts: • Example: Solar System, Moving Car, Flying Bird, Clock Simulation, or Logo Animation.	

CO	Course Outcomes
CO1	Apply knowledge of graphics libraries to initialize and execute a simple graphics application.
CO2	Implement and analyze line rasterization algorithms in computer graphics.
CO3	Demonstrate proper coordinate mapping between window and viewport systems.
CO4	Design smooth morphing transitions between 2D objects using animation techniques.
CO5	Design and develop an animated graphical application combining multiple computer graphics concepts

Textbooks:	
1	Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000
2	D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment& Frame work, 2000
3	Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
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3	https://www.programiz.com/computer-graphics
4	https://nptel.ac.in/courses/106/102/106102157/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	2	1	1	2	2	3	1	2
CO2	3	3	3	2	2	2	2	2	3	2	3
CO3	2	3	3	3	2	1	1	3	2	3	3
CO4	2	2	3	2	3	2	2	3	2	2	3
CO5	2	3	3	3	3	3	2	3	3	3	3
Total	12	13	15	12	11	9	9	13	13	11	14
Average	2	3	3	2	2	2	2	3	3	2	3

3 – Strong, 2- Medium, 1- low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCAS41	**DATA MINING**	SEC-V	1	0	1	0	2	2	25	75	100

Learning Objectives	
LO1	To learn about the basics of data and data mining concepts.
LO2	To understand the fundamentals of analytical and data warehousing concepts
LO3	To understand the techniques that are followed in data mining.
LO4	To understand the basics of outlier detection and clustering concepts
LO5	To understand the tools that are used in data mining.

Unit	Content	Hours
1	**INTRODUCTION** What is Data Mining– Kinds of Data – Kinds of patterns – Technologies used for Data Mining– Major Issues in Data Mining– Data –Data Objects and Attribute types– Data Visualization– Measuring Data Similarity and Dissimilarity-Data Preprocessing-overview-Data Cleaning-Data integration-Data Reduction	6
2	**CONCEPTS OF DATA WAREHOUSE** Data Warehouse– Basic concepts–Data Warehouse Modelling: Data Cube and OLAP– Data Warehouse Design and Usage– Data Warehouse Implementation–Data Generalization by Attribute–Oriented Induction– Data Cube Technology–Data Cube Computation Methods– Exploring Cube Technology–Multidimensional Data Analysis in cube space-Tools for Data warehouse development	6
3	**CONCEPTS OF PATTERN** Patterns– Basic concepts– Pattern Evaluation Methods–Pattern Mining: Pattern Mining in Multilevel– Multidimensional space–Constraint–Based Frequent Pattern Mining– Mining High Dimensional Data and Colossal patterns Classification–Decision tree Induction– Bayes Classification methods– Rule based Classification.	6
4	**CLUSTERS** Cluster Analysis– Partitioning Methods – Hierarchical Methods – Density – Based Methods– Grid – Based Methods – Evaluation of Clustering – Clustering High – Dimensional Data–Clustering Graph and Network Data.	6
5	**DATA MINING METHODOLOGIES** Methodologies of Data Mining – Data Mining Applications – Data Mining Trends – Recent Data Mining Tools – Rapid miner – Orange – Weka–Knime–Sisense –Ssdt (SQL Server Data Tools) – Oracle – Rattle – Data melt – Apache Mahout,Tools for Meta data Management	6

CO	Course Outcomes- On completion of this course, students will be
CO1	To understand about the basics of data mining and data.
CO2	To understand about the methods of Data Warehousing
CO3	To understand about the techniques of Data Mining
CO4	To understand about the importance of Cluster and outlier detection
CO5	To improve the student's knowledge with recent trends and tools

Textbooks:	
1	"Data Warehousing Fundamentals", Paulraj Ponnaiah, Wiley Publishers, 2001.
2	"Data Mining: Concepts and Techniques", Jiawei Han, MichelineKamber, Morgan Kaufman Publishers, 2006.
3	"Introduction to Data mining with case studies", G.K. Gupta, PHI Private limited, New Delhi, 2008. 2nd Edition, PHI, 2011
4	Data Mining: Concepts and Techniques – Jiawei Han, Jian Pei, Hanghang Tong
5	Data Mining: Essential Concepts for Analytics – Dr. K. Seefeld (2024)

Reference Books:	
1	"Advances in Knowledge Discover and Data Mining", Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, the M.I.T. Press, 2007.
2	"The Data Warehouse Toolkit", Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3	"Building Data Mining Applications for CRM", Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.
4	"Data Mining: Introductory and Advanced Topics", Margaret Dunham, Prentice Hall, 2002.
5	"Discovering Knowledge in Data: An Introduction to Data Mining", Daniel T.Larose John Wiley & Sons, Hoboken, New Jersey, 2004

Web resources:	
1	https://www.geeksforgeeks.org/data-mining/
2	https://www.tutorialspoint.com/data_mining/index.htm
3	https://nptel.ac.in/courses/106106224
4	https://www.coursera.org/specializations/data-mining
5	https://www.edx.org/learn/data-mining

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	3	3	1	2	3
CO2	3	3	2	2	3	2	3	3	3	1	2
CO3	2	3	3	3	3	3	2	3	3	3	3
CO4	3	3	3	1	3	3	3	3	2	3	3
CO5	3	3	2	2	3	3	3	3	2	3	2
Total	14	15	13	10	15	13	14	15	11	12	13
Average	2.8	3	2.6	2	3	2.6	2.8	3	2.2	2.4	2.6

3 – Strong, 2- Medium, 1- Low