



ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A++' Grade by NAAC(CGPA:3.58/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

BA I Semester

Paper- Major

Database Management System

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	Understand fundamental concepts of database management systems.	U
CO 2	Gain proficiency in relational databases, SQL queries, and normalization techniques.	U
CO 3	Learn transaction management, concurrency control, and recovery techniques.	U, Analyze
CO 4	Develop skills to implement databases using MS Access, MySQL, or PLSQL.	Apply
CO 5	Analyze the three-level database architecture (external, conceptual, internal) and various data models (Hierarchical, Network, Relational) to evaluate their significance in database design.	Apply

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	30	70	100
Practical	2	30	70	100
Total	6	200		

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)
Practical	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)



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BA I Semester

Paper-Major

Database Management System

Content of the Course

Theory

Maximum Marks: 70

Units	Topics	No. of Lectures
I	Indian Knowledge System (IKS) in DBMS, Traditional Indian methods of knowledge storage and their relevance to modern databases. Ancient Indian texts, temple records, and manuscripts, Concepts like data organization, indexing, and retrieval in Vedic literature. DBMS applications in IKS include digitization of manuscripts, Sanskrit computational linguistics, and digital preservation initiatives like the National Mission for Manuscripts.	10
II	Definition of database and DBMS, characteristics and advantages, comparison between file system and database, database users and administrator roles, applications of databases, introduction to different data models including hierarchical, network, relational, and object-oriented models. Overview of DBMS architectures such as one-tier, two-tier, and three-tier models, data abstraction and data independence, conceptual, logical, and physical data models.	10
III	Introduction to the relational model, relational schema and tuples, concept of keys including primary key, foreign key, candidate key, and super key, integrity constraints such as domain, entity, referential, and key constraints. Overview of relational algebra and its operations for data manipulation. Introduction to SQL, importance of SQL in databases, SQL data types and constraints, SQL commands. Creating and managing tables in SQL, performing basic SQL queries such as SELECT, INSERT, UPDATE, DELETE, and understanding joins including INNER JOIN, OUTER JOIN, LEFT JOIN, and RIGHT JOIN.	10
IV	Database Design, Normalization and Indexing, Denormalization and its impact on performance, database design process, and schema refinement. Database security concepts, security threats and their solutions, authentication and authorization mechanisms, role of database administrators (DBA), indexing techniques for query optimization, single-level and multi-level indexing, clustered and non-clustered indexing.	15
V	Transactions, Concurrency Control, and Recovery Mechanisms Concept of transactions and ACID properties, need for concurrency control, problems of concurrent transactions, lock-based concurrency control, timestamp-based concurrency control, and deadlocks in databases with prevention techniques. Overview of database recovery, recovery techniques such as log-based recovery. checkpointing, shadow paging, and ARIES recovery algorithm. Implementation of transaction management in SQL with COMMIT and ROLLBACK operations.	15

References

Text Books:

- Database System Concepts–Abraham Silberschatz, Henry Korth, S.Sudarshan(McGraw Hill).
- Fundamentals of Database Systems–Ramez Elmasri, Shamkant B.Navathe (Pearson).



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BA I Semester

Paper-Major

Database Management System

List of Practical

1. Create a database named CollegeDB with a table Students having attributes: StudentID (Primary Key), Name, Age, Course, and Email. Insert at least five records.
2. Write an SQL query to fetch details of students who are enrolled in the 'B.Sc CS' course.
3. Given the table Employee (EmpID, Name, Dept, Salary, Address), identify functional dependencies and normalize it up to BCNF.
4. Create an index on the Salary column in the Employee table.
5. Write an SQL transaction where you transfer ₹5000 from one bank account to another and ensure ACID properties.
6. Implement an SQL commit and rollback example for an inventory management system.



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BA I Semester

Paper-Minor

Python Programming

CO. No.	Course Outcomes	Cognitive Level
CO 1	Understand Python fundamentals, syntax, and control structures.	U
CO 2	Apply object-oriented programming concepts in Python.	U
CO 3	Learn data handling, visualization, and automation techniques.	U, Analyze
CO 4	Gain hands-on experience with web development and database connectivity.	Apply
CO 5	To learn the different Libraries in Python.	Apply
CO 6	To know about the Data Visualization.	Apply

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	30	70	100
Practical	2	30	70	100
Total	6	200		

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)
Practical	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)



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BA I Semester

Paper-Minor

Python Programming

Maximum Marks: 70

Units	Topics	No. of Lectures
I	Introduction to Python and Basics History and evolution of Python, features and applications, installation and setup of Python environment (IDLE, Anaconda, Jupyter Notebook, VS Code), Python syntax and indentation, variables and data types (numbers, strings, lists, tuples, sets, dictionaries), type conversion, input and output functions, comments and documentation strings, basic operators (arithmetic, relational, logical, assignment, bitwise).	15
II	Control Structures and Functions Conditional statements (if, if-else, elif), looping structures (for loop, while loop, nested loops), break, continue, and pass statements, defining and calling functions, function arguments (positional, keyword, default, variable-length), return statement, scope of variables (global and local scope).	15
III	Data Structure Lists: creating, indexing, slicing, adding, removing, updating elements, list comprehension; Tuples: definition, accessing elements, immutable nature; Dictionary: key-value pairs, adding, updating, deleting elements. String handling: slicing, concatenation, string functions.	15
IV	Data Handling using Pandas Introduction to Python libraries- Data structures in Pandas - Series and Data Frames. Series: Creation of Series from – ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing. Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing; Importing/Exporting Data between CSV files and Data Frames.	15
V	Data Visualization Purpose of plotting; drawing and saving following types of plots using Matplotlib – line plot, bar graph, histogram, pie chart, Scatter Graph, box plot. Customizing plots: adding label, title, and legend in plots.	10

Suggested Reference Books:

1. Python Crash Course – Eric Matthes (No Starch Press).
2. Learning Python – Mark Lutz (O'Reilly).
3. Python Programming: An Introduction to Computer Science – John Zelle.
4. Fluent Python – Luciano Ramalho (O'Reilly).

Suggestive Digital Platform Weblinks:

- <https://www.python.org/doc/> – Official Python Documentation.



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- <https://www.w3schools.com/python/> – Beginner-friendly Python tutorials.
 - <https://www.tutorialspoint.com/python/> – Python concepts with examples.
 - <https://www.geeksforgeeks.org/python-programming-language/> – Python problem-solving and implementation.
- <https://nptel.ac.in/courses/106/106/106106182> – NPTEL Course on Python for Data Science.

List of Practical

1. Write a Python Program to accept two numbers from the user and perform simple calculations.
2. Write a Python Program to accept marks of 5 subjects and calculate the percentage.
3. Write a Python program to print the multiplication table of user specified number.
4. Convert temperature from Celsius to Fahrenheit and vice versa using Python.
5. Write a Python script that takes a number as input and prints whether it is even or odd.
6. Write a function that calculates factorial of a given number.
7. Create a Python program to add, remove, and update elements in a list dynamically.
8. Create a Data Frame 'Student' with attributes name, roll number, and marks. Implement methods to display student details.
9. Write a Python script to plot a bar chart using Matplotlib for student marks.



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BA II Semester

Major Paper 1

Maximum Marks-70

PART A: Introduction			
Program: Certificate	Class: UG	Year:1 Year	Session:2025-26
Subject: Computer Application			
1	Course Code	C2	
2	Course Title	Office Automation (Paper-I)	
3	Course Type (Core Course/Elective/Generic Elective/Vocational)	Core Course	
4	Pre-Requisite(if any)	At least Intermediate in Any course/ stream	
5	Course Learning Outcomes(CLO)	On the completion of this course, students will be able to: • Gain hands-on skills in MS Windows, MS Word, MS Excel, MS Access, and MS PowerPoint. • Automate routine office tasks using spreadsheets and macros. • Design well-structured documents with advanced formatting techniques. • Develop professional presentations with animations and transitions. • Integrate traditional Indian knowledge systems into office automation workflows.	
6	Credit Value	Theory-4Credits	
7	Total Marks	Max.Marks:30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week):2 Hrs. per week			
Total No. Of Lectures: 60 Hrs.			
Module	Topics	No. of Lectures	
I	Indian Knowledge System (IKS) and its Relevance to MS Office Ancient Indian knowledge traditions in documentation, record- keeping, and manuscript writing; Evolution of structured writing systems from palm leaf manuscripts to modern digital documentation; Role of Vedic and post-Vedic literature in structured data storage and information retrieval; Traditional methods of calculation and tabulation in ancient India and their relevance to modern spreadsheet applications; Ethical aspects of Indian knowledge systems and their application in professional documentation and communication; Indian logic systems (Nyaya, Mimamsa) and their structured approach to problem-solving in database and spreadsheet management; Use of Sanskrit grammatical rules as an analogy to modern data structuring principles; Lessons from ancient Indian education systems (Nalanda, Takshashila) on effective presentation and communication skills; Adaptation of Indian knowledge preservation techniques in modern document management using MS Office tools.	10	



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	Keywords: Indian Knowledge System, Vedic Literature, Ancient Documentation, Palm Leaf Manuscripts, Data Structuring, Ethical Documentation, Computational Logic, Nalanda, Takshashila, Traditional Tabulation. Activity: • Research and present ancient Indian documentation methods (e.g., palm leaf manuscripts). • Create a digital document in MS Word that simulates ancient record-keeping methods. • Use Excel to perform traditional tabulation techniques inspired by Indian mathematics. • Apply ethical documentation practices inspired by Dharma principles in MS Office reports. • Develop a PowerPoint presentation on ancient Indian education systems (Nalanda, Takshashila) and their relevance to modern communication skills.	
II	MS Windows Introduction to MS Windows; Features of Windows; Various versions of Windows & their use; Working with Windows; My Computer & Recycle Bin; Desktop, Icons, and Windows Explorer; Screen description & working styles of Windows; Dialog Boxes & Toolbars; Working with Files & Folders; Shortcuts & Autostarts; Accessories and Windows Settings using Control Panel; Start button & Program lists; Installing new Hardware & Software. Keywords: Windows Versions, Control Panel, Explorer, Shortcuts, File Management, Hardware, Software Installation. Activity: • Identify and compare different versions of Windows and their features. • Practice using Windows Explorer for file and folder management. • Customize Windows settings using the Control Panel. • Demonstrate the process of installing new hardware and software. • Create and manage shortcuts and autostart programs.	10



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III	Basics of MS Word Creating Word documents; The Word Window, Entering Texts, Editing Document texts; Selecting Texts, Copying and Moving Texts; Applying Text Enhancements; Applying Fonts and Font Styles in Word, Highlighting Text for a Distinctive Look. Aligning and Formatting; Aligning Text using identification options, Setting Line Spacing Options using Tabs. Creating Lists, Numbers, and Symbols; Numbering and Bullets, Creating Special Characters. Replacing and checking Text; Creating and Applying Frequently used Texts, Finding and Replacing Texts, More about Spelling and Grammar using the Thesaurus Command. Getting Print using Print Preview, Changing Page Orientation and Paper Size, Aligning Text Vertically, Setting Margins, Printing Options. Advanced Formatting Techniques in Word: Formatting Pages; Formatting Sections, Creating and Modifying Page Numbers, Creating Headers and Footers, Taking Care of Loose Ends, Working With Columns; Working With Newspaper Columns, Revising Column Structure. Constructing High-Quality Tables; Creating and Revising Tables, Modifying Table Structure, Formatting Table, Creating Outlines in Word using Templates, Use of Mail Merge in Microsoft Word. Keywords: Word Processing, Text Formatting, Tables, Headers, Footers, Columns, Mail Merge, Printing. Activity: • Create and format a document with different fonts, styles, and alignments. • Use bullets, numbering, and special characters to enhance a document. • Perform spell check, find, and replace operations. • Design a table and modify its structure and formatting. • Practice mail merge to generate personalized letters. • Print the document using Print Preview and adjust page settings.	10
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IV	MS Access Concepts & terms: database tables, relational database, records, fields, controls & objects, queries, forms, reports properties, wizards, macros, MS Access requirements, starting & quitting MS Access, MS Access workspace, tool & views. Creating database & tables with & without wizard, field name, data types & properties, adding & deleting fields, renaming fields & their caption, resizing fields, freezing columns, primary key field & indexing fields. MS Access Form: Form wizard, Saving & Modifying forms, Entering & Editing data, Finding, sorting & displaying data, creating queries, using select queries and wildcards. MS Reports: Creating reports, Previewing reports, Printing reports, modifying & Saving reports. Relational databases: definition, purpose, creation, viewing, deleting. Expressions, Create PivotTable or PivotChart views in an Access desktop database. Keywords: Database, Tables, Queries, Forms, Reports, Primary Key, Indexing, PivotTables, Macros. Activity: • Create a database with multiple tables and set relationships. • Use form wizard to create and modify forms. • Perform query operations using select queries and wildcards. • Generate and customize reports with different properties. • Create and analyze PivotTables or PivotCharts in Access. • Practice using macros to automate repetitive tasks.	10
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V	Creating Excel Worksheets Entering and Editing Cell Entries: Excel Application Window, Workbooks and Worksheets, Moving the Cell Pointer, Entering Text and Numbers, Revising Text and Numbers. Working with Numbers: Creating Formulae, Formatting numbers. Changing Worksheet Layout; Adjusting Column Width and Row Height, Inserting and Deleting Rows and Columns, Inserting and Deleting Cells, Moving and Copying Cell Contents, Naming Worksheets, Selecting Worksheets, Copying and Moving Worksheets, Inserting and Deleting Worksheets. Other Formatting Options: Aligning Text, Border and Color. Printing in Excel: Print Preview, Changing Page Setup, Checking Worksheet Spelling. Advanced Techniques in Excel: Using Functions and References; Use of Functions, Entering Functions, Relative and Absolute Cell References. Creating Named Ranges, Creating Easy-to-Understand Charts; Pie Charts, Series Charts, Creating Charts, Moving, Sizing and Printing Chart Objects. Editing and Formatting Charts: Adding a Data Series, Deleting a Data Series, Modifying and Formatting Charts. Macros: Creation of Pivot Table to analyze worksheet data. Keywords: Worksheets, Formatting, Formulas, Functions, Charts, PivotTables, Macros, Data Analysis. Activity: • Create an Excel worksheet with multiple sheets and apply formatting. • Use formulas and functions for data calculation. • Generate and customize charts (Pie, Series) using Excel data. • Create and analyze PivotTables for data summarization. • Develop a macro to automate a repetitive task. • Use print preview and modify page setup for better print output.	10
VI	Creating PowerPoint Presentations Creating a Basic Presentation, Building Presentations, Modifying Visual Elements, Formatting and Checking Text, Adding Objects, Applying Transitions, Animation Effects and Linking, Preparing Handouts. Keywords: Presentations, Slides, Animations, Transitions, Handouts, Formatting, Multimedia. Activity: • Create a basic PowerPoint presentation with multiple slides. • Apply transitions and animation effects to enhance visual appeal. • Add and format text, images, and multimedia objects.	10



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	• Prepare handouts for presentation distribution. • Use slide linking for navigation between different sections. • Check and improve text formatting and consistency.	
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings: 1. Microsoft Office 97: Will Train, Gini Courter, Annette Marquis (BPB Publication). 2. Microsoft Office 2000: Gini Courter & Annette Marquis (BPB Publication). 3. MS Office 2000 for Everyone: Saxena Sanjay, sschnd. 4. Writer's Guide to Microsoft Word: Kari Holloway. 5. Access 2016 Bible: Michael Alexander, Richard Kusleika. 6. Excel 2019: Greg Harvey / Microsoft PowerPoint Made Easy: Chris Smith.		
Suggestive Digital Platform Web Links: 1. https://www.webucator.com/how-to/how-use-mail-merge-microsoft-word.cfm – How to Use Mail Merge in Microsoft Word. 2. https://support.microsoft.com/en-us/office/create-pivottable-or-pivotchart-views-in-an-access-desktop-database-83e524df-dfbd-456d-9dd0-0a48claa6752 – Create PivotTable or PivotChart Views in an Access Database. 3. https://support.microsoft.com/en-us/office/create-a-pivottable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576 – Create a PivotTable to Analyze Worksheet Data. 4. https://www.youtube.com/watch?v=Zv3XI/IBb3V6A – YouTube Tutorial on MS Office. 5. http://www.digimat.in/nptel/courses/video/l21106007/L12.html – NPTEL MS Office Course Video.		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/105/106105163/		
PART D: Assessment and Evaluation		
Maximum Marks:	100	
Continued Comprehensive Evaluation(CCE):	30	
University Exam(UE):	70	
Time: 03:00 Hours		
Internal Assessment: Continued Comprehensive Evaluation(CCE):	Class Tests/Presentation/Assignment	30 Marks
External Assessment: University Exam	Section(A): Very Short Questions Section(B) : Short Questions Section(C): Long Questions	70 Marks



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PART A:Introduction			
Program: Certificate	Class: UG	Year:1 Year	Session: 2025-26
Subject: Computer Application			
1	Course Code	CI	
2	Course Title	Office Automation Lab(Paper1)	
3	Course Type(Core Course/Elective/Generic Elective/ Vocational)	Core-Course B.Sc. 2024-25	
4	Pre-Requisite(if any)	To study this course, a student must have had the class. (S1-COAP1T)	
5	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: Gain hands-on skills in MS Windows, MS Word, MS Excel, MS Access, and MS PowerPoint. Automate routine office tasks using spreadsheets and macros. Design well-structured documents with advanced formatting techniques. Develop professional presentations with animations and transitions.	
6	Credit Value	Practical-2Credits	
7	Total Marks	Max.Marks:30+70	Min.PassingMarks:35
PART B:Content of the Course			
No. of Lab. Practical's(in hours per week):2Hrs.perweek			
Total No. of Labs:		30	
	Suggestive list of Practical's	No. of Labs.	



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	MS Office Practical Tasks with Proper Spacing 1. To create a document and insert header and footer, page title, and page numbers. 2. Insert a table, picture, clipart, and chart into the document. 3. To create a document for writing mathematical equations. 4. To create a document, set the margins, orientation, size, columns, watermark, page color, and page borders. 5. To create a document using mail merge by connecting a database. 6. To print an invitation letter using mail merge. 7. To design a table, form, and report in Access. 8. To design Queries and macros in Access. 9. To get external data from elsewhere and move it to Access. 10. Access Database, generate report and label. 11. To encrypt Database with a password in Access. 12. Creating, editing, saving, printing, securing & protecting operations of an Excel spreadsheet. 13. To prepare different types of charts in Excel. 14. To create students' data for identity cards along with photos, signatures, etc., and print it. 15. To create bar chart & pie chart in Excel for analysis of five years' results of your institute. 16. To prepare an attendance sheet of 10 students for any 6 subjects of your syllabus. To calculate their total attendance, total percentage of attendance of each student & average attendance. 17. To create PivotTable using multiple sources of data in Excel. 18. Applying themes and layouts to PowerPoint slides and inserting pictures, graphics, shapes, and tables into presentations. 19. To create PowerPoint slides using transitions and animations, working with master slides. 20. To create a professional slide for presentation in PowerPoint.	70
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		



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Suggested Readings:

1. Microsoft Office 97: Will Train, Gini Courter, Annette Marquis (BPB Publication).
2. Microsoft Office 2000: Gini Courter & Annette Marquis (BPB Publication).
3. MS Office 2000 for Everyone: Saxena Sanjay, sschnd.
4. Writer's Guide to Microsoft Word: Kari Holloway.
5. Access 2016 Bible: Michael Alexander, Richard Kusleika.
6. Excel 2019: Greg Harvey / Microsoft PowerPoint Made Easy: Chris Smith.

Suggestive Digital Platform Web Links:

1. <https://www.webucator.com/how-to/how-use-mail-merge-microsoft-word.cfm> – How to Use Mail Merge in Microsoft Word.
2. <https://support.microsoft.com/en-us/office/create-pivottable-or-pivotchart-views-in-an-access-desktop-database-83e524df-dfbd-456d-9dd0-0a48claa6752> – Create PivotTable or PivotChart Views in an Access Database.
3. <https://support.microsoft.com/en-us/office/create-a-pivottable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576> – Create a PivotTable to Analyze Worksheet Data.
4. <https://www.youtube.com/watch?v=Zv3XI/IBb3V6A> – YouTube Tutorial on MS Office.
5. <http://www.digimat.in/nptel/courses/video/121106007/L12.html> – NPTEL MS Office Course Video.

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D:Assessment and Evaluation

Maximum Marks: 100
 Continued Comprehensive Evaluation(CCE): 30
 University Exam(UE): 70
 Time:03:00Hours

Internal Assessment: Continued Comprehensive Evaluation(CCE):	Class Tests/Presentation/Assignment	30 Marks
External Assessment: University Exam	Section(A):Very Short Questions Section(B):Short Questions Section(C):Long Questions	70 Marks

Any remarks/suggestions: Learnings in the course should be emphasized more on real world problems and their solutions.



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BA II Semester

Major Paper-II

PART A: Introduction			
Program: Certificate		Class: UG	Year: 1 Year
		Session: 2025-26	
Subject: Computer Application			
1	Course Code	C3	
2	Course Title	Object Oriented Programming using C++	
3	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Core Course	
4	Pre-Requisite (if any)	To study this course, a student must have had the class.	
5	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: • Learn the principles of object-oriented programming and apply them in C++. • Develop structured, reusable, and modular applications. • Implement file handling, exception handling, and STL. • Design optimized and scalable applications using C++. • Integrate structured problem-solving techniques with traditional Indian logic.	
6	Credit Value	Theory-4 Credits	
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Hrs. per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics		No. of Lectures
I	Indian Knowledge System (IKS) and Programming Concepts Ancient Indian contributions to mathematics and logic (Aryabhata, Brahmagupta) and their relevance to computational models. Concepts of structured problem-solving in Indian logic (Nyaya, Mimamsa) and their influence on algorithmic thinking. Traditional knowledge classification systems and their parallels in modern databases and file structures. Application of IKS in Object- Oriented Programming: • Data Structures & Algorithms: Influence of Indian mathematics on recursion and sorting techniques. • Logical Reasoning in Programming: Vedic methods for structured reasoning applied in decision-making constructs. • Code Efficiency & Optimization: Ancient computational efficiency principles and their application in modern programming practices. Keywords: Indian Knowledge System, Vedic Mathematics, Ancient Algorithms, Computational		10



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	Thinking, Logic Systems. Activities: • Research ancient Indian algorithmic techniques and implement a sorting algorithm using them. • Create programs simulating Vedic computational methods. • Develop a project showcasing logic systems inspired by Nyaya or Mimamsa. • Apply traditional data classification concepts to a small database project.	
II	Introduction to Object-Oriented Programming & C++ Basics Introduction to programming paradigms: Procedural vs. Object-Oriented Programming; Features and benefits of Object-Oriented Programming (OOP). Basics of C++ programming: Syntax, data types, variables, constants, operators, expressions, input/output handling using cin and cout. Control structures: Decision-making statements (if, if-else, switch), looping constructs (for, while, do-while). Functions in C++: Function declaration, definition, function overloading, inline functions, recursion. Keywords: OOP, Procedural vs. Object-Oriented, C++ Syntax, Variables, Operators, Loops, Functions. Activities: • Write a C++ program using basic syntax, cin, and cout. • Demonstrate looping constructs with nested loops. • Create a recursive function to calculate factorial or Fibonacci series. • Implement a simple C++ program with function overloading.	10
III	Classes, Objects, and Memory Management Concept of a class and object: Defining a class, creating objects, accessing class members. Constructors and destructors: Types and uses, this pointer. Static data members and static member functions: Friend functions and friend classes. Dynamic memory allocation: Using new and delete. Other concepts: Array of objects, object as function arguments, returning objects from functions. Keywords: Classes, Objects, Constructors, Destructors, Static	10
	Members, Friend Functions, Dynamic Memory. Activities: • Create a C++ program with multiple classes and objects. • Implement constructor overloading in a C++ project. • Use dynamic memory allocation to create and manage an array	



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	of objects. Write a program demonstrating friend functions and static members.	
IV	Inheritance, Polymorphism, and Operator Overloading Concept of inheritance: Types of inheritance: single, multiple, multilevel, hierarchical, hybrid, visibility modes in inheritance, function overriding, virtual base class. Polymorphism: - Compile-time polymorphism: Function overloading, operator overloading. - Runtime polymorphism: Virtual functions, pure virtual functions, abstract classes. Operator overloading: Rules for operator overloading, overloading unary and binary operators, type conversion. Keywords: Inheritance, Polymorphism, Virtual Functions, Function Overloading, Operator Overloading. Activities: - Implement single and multiple inheritance in a C++ program. - Create an application demonstrating function overloading and overriding. - Use operator overloading for arithmetic operations on custom objects. - Develop a polymorphic base class with derived classes implementing different functionalities.	10
V	File Handling and Advanced C++ Features File stream classes in C++: Reading/writing files, file modes, file pointers, error handling in file operations. Templates: - Function templates and class templates - Advantages of generic programming Exception handling: Using try, catch, throw, and handling multiple exceptions. Standard Template Library (STL): - Containers: vector, list, map, set - Iterators - Algorithms Keywords: File Handling, Templates, Exception Handling, STL, Containers, Iterators. Activities: - Write a program to read and write data to a file. - Create a template-based sorting function. - Demonstrate exception handling with multiple catch blocks.	10
	Use STL containers and iterators to build a small data structure.	



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VI	Applications of C++ and Industry Practices Real-world applications of C++: System programming, game development, financial applications, embedded systems. Introduction to GUI programming with C++: Basics of Qt. Debugging techniques: Profiling tools and code optimization methods. Capstone project: Building an application using OOP concepts. Keywords: C++ Applications, GUI, Debugging, Optimization, Capstone Project. Activities: • Create a mini C++ project with GUI using Qt framework. • Demonstrate code optimization techniques in a C++ program. • Use debugging tools to identify and fix errors in a C++ project. • Design a financial calculator or inventory management system.	10
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings: 1. The C++ Programming Language – Bjarne Stroustrup (Addison-Wesley). 2. C++ Primer – Stanley B. Lippman, Josée Lajoie, Barbara E. Moo (Pearson). 3. Effective C++ – Scott Meyers (O'Reilly). 4. Accelerated C++ – Andrew Koenig, Barbara E. Moo (Addison-Wesley). 5. Programming: Principles and Practice Using C++ – Bjarne Stroustrup. 6. Object-Oriented Programming in C++ – Robert Lafore. Suggestive digital platform web links: 1. https://cplusplus.com/doc/tutorial/ – C++ Documentation and Tutorials. 2. https://learn-cpp.com/ – Learn C++ with hands-on examples. 3. https://cplusplus.com/ – C++ Programming from basics to advanced concepts. 4. https://cplusplus.com/ – C++ problem-solving and implementation. 5. https://nptel.ac.in/courses/106/105/106105151 – NPTEL Online Course on Programming in C++.		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/105/106105163/		
PART D: Assessment and Evaluation		
Maximum Marks :100 Continued Comprehensive Evaluation (CCE):30 University Exam(UE):70 Time:03:00 Hours		



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Internal Assessment: Continued Comprehensive Evaluation (CCE):	Class Tests/ Presentation / Assignment	30 Marks
External Assessment: University Exam	Section(A):Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 Marks

Any remarks/suggestions: Learning's in the course should be emphasized more on practical aspects and real world problems and their solutions.

PART A: Introduction

Program: Certificate **Class:** UG **Year:** 1 Year **Session:** 2025-26

Subject: Computer Application

1	Course Code	C3
2	Course Title	Object Oriented Programming using C++
3	Course Type (Core Course/Elective/Generic Elective/ Vocational	Core-Course
4	Pre-Requisite (if any)	To study this course, a student must have had the class.
5	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: • Learn the principles of object-oriented programming and apply them in C++. • Develop structured, reusable, and modular applications.
		• Implement file handling, exception handling, and STL. • Design optimized and scalable applications using C++.
6	Credit Value	Practical-2 Credits
7	Total Marks	Max. Marks: 30+70 Min. Passing Marks: 35

PART B: Content of the Course

No. of Lab. Practical's (in hours per week): 2 Hrs. per week

Total No. of Labs:30

	Suggestive list of Practical's	No. of Labs.
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	C++ Practical Tasks 1. Write a C++ program to demonstrate basic input and output operations using cin and cout. 2. Implement a C++ program to demonstrate data types, operators, and type conversion. 3. Write a program to implement control structures (if-else, switch-case, loops). 4. Implement functions in C++, including function overloading and recursion. 5. Write a C++ program to demonstrate call by value and call by reference. 6. Implement a C++ program to define a class and create objects. 7. Write a program to use constructors and destructors in a class. 8. Implement a program to demonstrate static data members and static functions. 9. Write a program to implement friend functions and friend classes. 10. Implement a C++ program to demonstrate this pointer and dynamic memory allocation. 11. Write a program to implement single inheritance with base and derived classes. 12. Implement a program to demonstrate multiple inheritance. 13. Write a program to implement multilevel inheritance in C++. 14. Implement a C++ program to demonstrate hierarchical inheritance. 15. Write a program to implement hybrid inheritance using virtual base classes. 16. Implement polymorphism by demonstrating function overloading and function overriding. 17. Write a program to implement operator overloading (unary and binary operators). 18. Implement a C++ program to demonstrate virtual functions and pure virtual functions. 19. Write a program to create a template function and a template class. 20. Implement a program to demonstrate exception handling using try, catch, and throw.	70
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		



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Suggested Readings:

1. The C++ Programming Language – Bjarne Stroustrup (Addison-Wesley).
2. C++ Primer – Stanley B. Lippman, Josée Lajoie, Barbara E. Moo (Pearson).
3. Effective C++ – Scott Meyers (O'Reilly).
4. Accelerated C++ – Andrew Koenig, Barbara E. Moo (Addison-Wesley).
5. Programming: Principles and Practice Using C++ – Bjarne Stroustrup.
6. Object-Oriented Programming in C++ – Robert Lafore.

Suggestive Digital Platform Web Links:

- <https://cplusplus.com/doc/tutorial/> – C++ Documentation and Tutorials.
- <https://learn-cpp.com/> – Learn C++ with hands-on examples.
- <https://www.youtube.com/watch?v=8aGhYQF8tGQ> – C++ Programming from basics to advanced concepts.
- <https://www.youtube.com/watch?v=8aGhYQF8tGQ> – C++ problem-solving and implementation.
- <https://nptel.ac.in/courses/106/105/106105151> – NPTEL Online Course on Programming in C++.

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D: Assessment and Evaluation

Maximum Marks :100

Continued Comprehensive Evaluation (CCE):30

University Exam(UE):70

Time:03:00 Hours

Internal Assessment: Continued Comprehensive Evaluation (CCE):	Class Tests/ Presentation / Assignment	30 Marks
External Assessment: University Exam	Section(A):Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 Marks

Any remarks/suggestions: Learnings in the course should be emphasized more on real world problems and their solutions.



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BA II Semester

Minor Paper- Operating System

PART A: Introduction			
Program: Certificate	Class: UG	Year:1Year	Session:2025-26
Subject: Computer Application			
1	Course Code	M2	
2	Course Title	Operating System(Theory)	
3	Course Type (Core Course/Elective/Generic Elective/Vocational)	Core Course	
4	Pre-Requisite(if any)	To study this course, a student must have had the class.	
5	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: • Understand the fundamental concepts, structure, and functions of operating systems. • Learn process management, memory management, file system organization, and device management. • Gain practical experience with system calls, process scheduling, and resource allocation. • Explore security mechanisms, system protection, and synchronization techniques. • Study emerging trends in operating systems, including cloud OS and real-time OS. • Understand traditional Indian computational logic and knowledge systems related to problem-solving.	
6	Credit Value	Theory-4Credits	
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks:35
PART B: Content of the Course			
No. of Lectures(in hours per week):2Hrs.perweek			
TotalNo.ofLectures:60 Hrs.			
Module	Topics		No. of Lectures



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Suggested Readings:

1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (Wiley).
2. Modern Operating Systems – Andrew S. Tanenbaum (Pearson).
3. Operating Systems: Internals and Design Principles – William Stallings (Pearson).
4. Operating Systems: A Concept-Based Approach – D. M. Dhamdhare (McGraw-Hill).
5. Linux Kernel Development – Robert Love (Addison-Wesley).
6. Designing Data-Intensive Applications – Martin Kleppmann (O'Reilly).

Suggestive Digital Platform Web Links:

- https://www.tutorialspoint.com/operating_system/index.htm – Comprehensive OS tutorials.
- <https://www.javatpoint.com/operating-system-tutorial> – OS basics, process management, and memory management.
- <https://www.geeksforgeeks.org/operating-systems/> – Detailed OS concepts with problem-solving exercises.
- <https://www.w3schools.in/operating-system-tutorial> – OS theory with practical examples.
- <https://nptel.ac.in/courses/106/102/106102132> – NPTEL online course on Operating Systems.

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D:Assessment and Evaluation

Maximum Marks: 100

Continued Comprehensive Evaluation(CCE): 30

University Exam(UE): 70

Time:03:00Hours

Internal Assessment: Continued Comprehensive Evaluation (CCE):	Class Tests/Presentation/Assignment	30 Marks
External Assessment: University Exam	Section(A):Very Short Questions Section (B) : Short Questions Section(C):Long Questions	70 Marks

Any remarks/suggestions: Learning's in the course should be emphasized more on practical aspects and real world problems and their solutions.

PART A:Introduction

02:00

Program: Certificate **Class: UG** **Year:1Year** **Session: 2025-26**

Subject: Computer Application

1	Course Code	M2
2	Course Title	Operating System Lab(Practical)
3	Course Type (Core Course/Elective/Generic Elective/Vocational)	Core-Course
4	Pre-Requisite(if any)	To study this course, a student must have had the class.



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5	Course Learning Outcomes(CLO)	On completion of this course, learners will be able to: • Understand the fundamental concepts, structure, and functions of operating systems. • Learn process management, memory management, file system organization, and device management. • Gain practical experience with system calls, process scheduling, and resource allocation. • Explore security mechanisms, system protection, and synchronization techniques. • Study emerging trends in operating systems, including cloud OS and real-time OS. • Understand traditional Indian computational logic and knowledge systems related to problem-solving.	
6	Credit Value	Practical-2Credits	
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35
PART B:Content of the Course			
No. of Lab. Practical's(in hours per week):2Hrs.perweek			
Total No. of Labs:		30	
	Suggestive list of Practical's	No. of Labs.	



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	Operating System Practical Tasks 1. Write a shell script to display system information (OS name, kernel version, CPU details). 2. Execute basic Linux/Windows commands like <code>ls</code>, <code>mkdir</code>, <code>cp</code>, <code>mv</code>, <code>rm</code>, <code>ps</code>, <code>top</code>, <code>df</code>, <code>du</code>, <code>chmod</code>, <code>chown</code>. 3. Implement a C program to execute system calls such as <code>fork()</code>, <code>exec()</code>, <code>wait()</code>, <code>getpid()</code>, <code>getppid()</code>. 4. Write a program to implement the First-Come-First-Serve (FCFS) scheduling algorithm. 5. Implement the Shortest Job First (SJF) CPU scheduling algorithm. 6. Develop a program for Round Robin Scheduling with a given time quantum. 7. Write a program to simulate Priority Scheduling. 8. Implement First Fit, Best Fit, and Worst Fit memory allocation strategies. 9. Write a program to simulate Paging and Page Replacement Algorithms (FIFO, LRU, Optimal). 10. Implement a program to demonstrate Segmentation. 11. Implement a File Allocation Table (FAT) Simulation. 12. Simulate Disk Scheduling Algorithms like FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK. 13. Develop a program to create and manipulate files using system calls (<code>open</code>, <code>read</code>, <code>write</code>, <code>close</code>). 14. Implement the Producer-Consumer Problem using semaphores. 15. Write a program to solve the Reader-Writer Problem using synchronization techniques. 16. Implement Deadlock Detection and Deadlock Avoidance (Banker's Algorithm). 17. Implement a simple User Authentication System using file handling in C/Python. 18. Simulate Access Control Mechanisms using permission bits in Linux. 19. Write a program to demonstrate Encryption & Decryption using basic cryptographic algorithms. 20. Write a C program for Inter-Process Communication (IPC) using Pipes.	70
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PART C:Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (Wiley).
2. Modern Operating Systems – Andrew S. Tanenbaum (Pearson).
3. Operating Systems: Internals and Design Principles – William Stallings (Pearson).
4. Operating Systems: A Concept-Based Approach – D. M. Dhamdhare (McGraw-Hill).
5. Linux Kernel Development – Robert Love (Addison-Wesley).
6. Designing Data-Intensive Applications – Martin Kleppmann (O'Reilly).

Suggestive Digital Platform Web Links:

- https://www.tutorialspoint.com/operating_system/index.htm – Comprehensive OS tutorials.
- <https://www.javatpoint.com/operating-system-tutorial> – OS basics, process management, and memory management.
- <https://www.geeksforgeeks.org/operating-systems/> – Detailed OS concepts with problem-solving exercises.
- <https://www.w3schools.in/operating-system-tutorial> – OS theory with practical examples.
- <https://nptel.ac.in/courses/106/102/106102132> – NPTEL online course on Operating Systems.

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105163/>

PART D:Assessment and Evaluation

Maximum Marks: 100
 Continued Comprehensive Evaluation(CCE): 30
 University Exam(UE): 70
 Time:03:00Hours

Internal Assessment: Continued Comprehensive Evaluation(CCE):	Class Tests/Presentation/Assignment	30 Marks
External Assessment: University Exam	Section(A):Very Short Questions Section(B): Short Questions Section(C): Long Questions	70 Marks

Any remarks/suggestions: Learnings in the course should be emphasized more on real world problems and their solutions.



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B.A. III Semester

Paper: - Major/Minor

Subject:- Database Management System

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	To understand database concepts, applications, structure, need and database terminologies.	Un
CO 2	To know about fundamentals of Relational Algebra and recovery & backup.	Un
CO 3	To gain skills to create logical design of databases, including the E R method and normalization approach.	Un, An
CO 4	To explore issues of transaction processing and concurrency control.	Un, An
CO 5	To acquire knowledge of back-end project management skills.	Ap,
CO 6	To get knowledge of Database and create own Database.	AP, E
CO 7	For implementation of different security features to secure the database.	Ap, E

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100
Practical	2	40	60	100
Total	6	200		

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) Best 2 will be taken	1 External Exam (At the End of Semester)
Practical	3 Internal Exams during the semester	1 External Exams (At the End of Semester)



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Content of the Course

Theory

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Introduction: Database system concepts:- Data base system, Advantages of database systems; Data Architecture of data system: View/Schema, logical, conceptual and physical and their interrelationship, data dictionary, Data base administrator. Types of Data Models:- Relational, Hierarchical and Network Model their advantages and disadvantages	12
II	Entity Relationship Model as a tool of conceptual design: Entities &Entity set, Relationship & Relationship set, Attributes, Mapping Constraints, Keys, Entity-Relationship diagram (E-R diagram) : Strong & weak entities, Generalization, Specialization, Aggregation, Reducing ER diagram to tables.	12
III	Normalization and SQL concept :- Normalization: First, Second, Third & BCNF Normal Forms, Introduction to SQL,tuple, attribute, Data types, key constraints:- primary key, Candidate key, Integrity rules : Entity integrity, Referential integrity rule.SQL Commands:- , DDL, DML, DCL, TCL syntax and examples, select query with all the clauses. Like Predicate , Operator (Between, In , Not in)	12
IV	Advance SQL:- SQL join operations, Sub queries and correlated queries, SQL Functions. Constraints in SQL. Introduction to PL/SQL :- PL/SQL structure, Cursors, Triggers, Stored Procedures and functions.	12
V	Functional Protection and Crash Recovery: protection against crashes: different types of crashes; backup, journal, rollback, committed and uncommitted transactions, security on database	12

Text Books:

1. An Introduction to Database System by Bipin Desai.
2. "Database System Concepts" by Abraham Silberschatz and S Sudarshan
3. "Database Management Systems" by Raghu Ramakrishnan
4. "Fundamentals of Database Systems" by R Elmasri and S Navathe
5. "Database Management Systems" by Johannes Gehrke and Raghu Ramakrishnan
6. Books published by M.P. Hindi Granth Academy, Bhopal



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List of Practical

1. Create a table with name "Employee" having following fields:-

Field Name	Data Type	Size	Constraint
Eid	Number	10	Primary Key
Ename	Char	20	Not null
Designation	Char	30	Not null
Age	Number	10	Not null
City	Varchar2	25	Not null
Department no	Varchar2	30	Not null
Salary	Decimal	(7,2)	Not null
BankName	Varchar2	30	Not null

2. Insert the following records in above table structure .

Eid	Ename	Designation	Age	City	Department	Salary	BankName
101	Ford	Manager	24	Mumbai	D1	67820.50	HDFC
102	Jenny	Asst. Mng .	30	Delhi	D1	45750.40	Axis
103	Mary	Clerk	35	Goa	D1	32000.00	Canara
104	Smith	Clerk	28	Madras	D1	28000.00	FBC
105	James	Clerk	27	Mumbai	D1	29000.00	ICICI
106	Anny	Clerk	32	Kolkata	D1	25000.00	Axis
107	Jones	Clerk	34	Delhi	D1	27000.00	HDFC
108	Michal	Clerk	31	Goa	D1	24000.00	FBC

Execute the following queries

1. WAQ to insert one new record in the table.
2. WAQ to change the Ename from Anny to Robin.
3. Delete any one record from table.
4. Add a new column in the employee table with name "email id" having datatype varchar2(15).
5. WAQ to display the entire table using DQL Command .
6. WAQ to display the specific records whose age is greater then 30 using where clause.
7. Display only the city column using where clause.
8. Display the name of employee whose name starts with "J" using predicate.
9. WAQ to find the name of the employees whose salary lies between 24000.00 to 28000.00
10. WAQ to list the number of employees whose name is not "Jenny","Mary","Ford".



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B.A III Semester

Subject:- Database Management System

Paper:- Open Elective

Maximum Marks: 60

Unit I

Introduction: Database system concepts, Data base system, Advantages of database systems; Data Architecture of data system: View/Schema, logical, conceptual and physical and their interrelationship, data dictionary, Data base administrator. Types of Data Models:- Relational, Hierarchical and Network Model their advantages and disadvantages

Unit II

Entity Relationship Model as a tool of conceptual design: Entities &Entity set, Relationship & Relationship set, Attributes, Mapping Constraints, Keys, Entity- Relationship diagram (E-R diagram) : Strong & weak entities, Generalization, Specialization, Aggregation, Reducing ER diagram to tables

Unit III

Normalization and SQL concept :- Normalization: First, Second, Third & BCNF Normal Forms, Introduction to SQL,tuple, attribute, Data types, key constraints:- primary key, Candidate key, Integrity rules : Entity integrity, Referential integrity rule.SQL Commands:- , DDL, DML, DCL, TCL syntax and examples, select query with all the clauses. Like Predicate , Operator (Between, In , Not in)

Unit IV

Advance SQL:- SQL join operations, Sub queries and correlated queries, SQL Functions. Constraints in SQL. Introduction to PL/SQL :-PL/SQL structure, Cursors, Triggers, Stored Procedures and functions.

Text Books:-

1. An Introduction to Database System by Bipin Desai.
2. “Database System Concepts” by Abraham Silberschatz and S Sudarshan
3. “Database Management Systems” by Raghu Ramakrishnan
4. “Fundamentals of Database Systems” by R Elmasri and S Navathe
5. “Database Management Systems” by Johannes Gehrke and Raghu Ramakrishnan
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B.A. IV Semester

Paper: - Major/Minor

Subject:- Introduction to ASP.NET& C#

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Introduction to .NET Framework: Programming Platform .NET Framework, .NET Architecture, CLR, the Just-in-Time Compiler, C# - The Basics and Console Applications in C#: Introduction to C#., Visual development & event driven Programming Methods and events. Data type, type conversion. Variables constants, operators, Decision making, Loops, Arrays.	12
II	Overview of OOPs: Class, Object ,Encapsulation, inheritance, polymorphism, abstraction, Understanding Constructors and instance Variables Handling and Using Interfaces. Preprocessor directives, Exception handling, Understanding Delegates in c#. Windows Forms and Controls: The Windows Forms Model, Creating Windows Forms, Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs - ToolTips.	12
III	Introduction to ASP.NET:- ASP.NET Life Cycle, page life cycle phases, Understanding ASP.NET Controls, Web forms, Web form controls ,server controls, client controls, HTML controls ,Navigation controls..	12
IV	Session Management :- Event Handling- Application and Session Events, Page and Control Events. Validation controls: RequiredFieldvalidator , RangeValidator, CompareValidator ,RegularExpressionValidator, CustomValidator, ValidationSummary	12
V	Database connectivity in ASP.NET: Architecture of ADO.NET, Connection Class, Command Class, Data Adapter Class, and Dataset Class, Display data on web form using Data bound controls	12

Text Books:

1. ASP .NET Unleashed C# programming — Wrox Publication.
2. C# Programming Black Book by Matt Talles.
3. VB.NET Programming Black Book by st.evenholzner —dreamteef publications
4. Mastering VB.NET by Evangelospetroustos- BPB publications
5. Introduction to .NET framework-Worx publication
6. Books published by M.P. Hindi Granth Academy, Bhopal



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B.A IV Semester

Paper:- Elective

Subject:-Introduction to ASP.NET & C#

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Introduction to .NET Framework: Programming Platform .NET Framework, .NET Architecture, CLR, the Just-in-Time Compiler, C# - The Basics and Console Applications in C#: Introduction to C#., Visual development & event driven Programming Methods and events. Data type, type conversion. Variables constants, operators, Decision making, Loops, Arrays.	11
II	Overview of OOPs: Class, Object, Encapsulation, inheritance, polymorphism, abstraction, Understanding Constructors and instance Variables Handling and Using Interfaces. Preprocessor directives, Exception handling, Understanding Delegates in c#. Windows Forms and Controls: The Windows Forms Model, Creating Windows Forms, Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs - ToolTips.	11
III	Introduction to ASP.NET:- ASP.NET Life Cycle, page life cycle phases, Understanding ASP.NET Controls, Web forms, Web form controls ,server controls, client controls, HTML controls ,Navigation controls.	12
IV	Session Management :- Event Handling- Application and Session Events, Page and Control Events. Validation controls: RequiredFieldvalidator, RangeValidator, CompareValidator, RegularExpressionValidator, CustomValidator, ValidationSummary Database connectivity in ASP.NET: Architecture of ADO.NET, Connection Class, Command Class, Data Adapter Class, and Dataset Class, Display data on web form using Data bound controls.	11

Text Books:

1. ASP .NET Unleashed C# programming — Wrox Publication.
2. C# Programming Black Book by Matt Talles.
3. VB.NET Programming Black Book by st.evenholzner —dreamteef publications
4. Mastering VB.NET by Evangelospetroustos- BPB publications
5. Introduction to .NET framework-Worx publication
6. Books published by M.P. Hindi Granth Academy, Bhopal



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BA V Semester Core Paper Operating System

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	To Understand to analyze the structure and basic architectural components involved in OS.	U
CO 2	To display competence in recognizing and using operating system features.	U
CO 3	To gain knowledge of implementation of different operating system aspects.	U, Analyze
CO 4	To apply knowledge of different operating system algorithm.	Apply
CO 5	To contribute and make enhancements in the features of operating system.	Apply
CO 6	To create new apps for business point of view.	Apply

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100
Practical	2	40	60	100
Total	6	200		

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)
Practical	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)



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BA V Semester

Paper-Core

Operating System **Content of the Course** **Theory**

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Introduction: Evolution of operating system, Types of operating system, Different view of operating system, Operating system concepts and structures. Processes: The process concept, system programmer's view of process, Operating system services for process management, Scheduling Algorithm, Performance evaluation.	12
II	Memory Management: Memory management without swapping or paging, swapping, virtual memory, page replacement algorithm, modeling paging algorithm, design issue for paging system, segmentation.	12
III	Inter-Process communication and synchronization: The need for inter-process synchronization mutual exclusion, semaphores, hardware support for mutual exclusion, implementation of semaphores, classical problem in concurrent programming, critical region and conditional critical region, monitors, messages.	12
IV	File System: File systems, directories, file system implementation, security protection mechanisms. Input / output: Principles of I/O Hardware: I/O devices, device controller, direct memory access. Principles of I/O software: Goals interrupt handlers, device driver, device independent I/O software.	12
V	Deadlock: Deadlock prevention, Deadlock avoidance. Disks: Disk hardware, scheduling algorithms, Error handling, track at a time caching, RAM disks. Clocks: Clock hardware, memory mapped terminals, I/O software.	12

References

Text Books:

- Operating System concepts – Avi silberschatz and Peter Galvin.
- Operating System: Internals and Design principles by William Stallings.
- Operating System: A design-oriented approach by Charles Crowley



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BA V Semester

Paper-Core

Operating System

List of Practical

1. Write a program to implement CPU scheduling algorithm using FCFS.
2. Write a program to implement CPU scheduling algorithm using SJF.
3. Write a program to implement CPU scheduling algorithm using Round Robin.
4. Write a program to implement CPU scheduling algorithm using Priority.
5. Write a program to implement Producer consumer problem using semaphores.
6. Write a program to implement dead lock avoidance and prevention.
7. Write a program to implement Page replace algorithm using FIFO and LRU.



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BA V Semester

DSE

Programming using JAVA

Maximum Marks-60

Unit	Topics	Lectures
I	The Java Environment: History and features of java, C++ VS java, JAVA Program Structure, Java Virtual Machine concepts, Primitive data types, variables and constants, operators, expression, Statements -branching, looping and jumping.	15
II	Object Oriented Programming in Java: Classes, objects and methods: defining a class, adding variables and methods, creating objects, constructor, Instances, field and methods initialization by constructors, Copy constructor. Arrays, String classes, Wrapper classes.	15
III	Inheritance: Inheritance basics, Super class, Sub-class, Method overloading, abstract classes. Interfaces: defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces.	15
IV	Multithreading and Exception Handling: Basic idea of multithreaded programming; The lifecycle of a thread, Creating thread with the thread class and runnable interface, Basic idea of exception handling: The try, catch and finally.	15
V	Applet programming-Local and Remote Applets, Applet Vs Application, creating and executing java applets, inserting applets in a web page, passing parameter to applets, Applet Tag, Getting Input from User.	15

Suggested Readings

- Java A Complete reference by Herbert Schildt, Mc Graw hill publication
- Thinking in Java (3rd edition) Bruce Eckel , Prentice Hall
- The Java Language Specification, Java SE 8 , Cay S. Horstmann, Gary Cornell, Prentice Hall
- Core Java an Integrated Approach (Black Book), Dr. R. Nageswara Rao, Prentice Hall



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BA VI Sem

Core

Computer Networks

Content Of the Course Computer Networks		
Total No. of Lectures =90 (in hours per week) 3-0-0		
Unit	Topics	No. of Lectures
I	Overview : Goals & Applications, Network Hardware: LAN,MAN,WAN and Internet, Wireless networks, Inter Networks, Network Software: Protocol Hierarchies, Design Issues, Interfaces and Services, Connection Oriented And Connection less Services, Service Primitives.	18
II	Introduction to Network , OSI reference model, TCP/IP	18

	reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission.	
III	Data Link Layer : Framing, Error Control, DLC Protocols: Simplex, Stop-and-Wait, Sliding Window protocol HDLC. Medium Access Sub Layer: Sliding Window Protocol. Static & Dynamic Channel allocation in LANs & MANs. ALOHA & slotted ALOHA.	18
IV	Network Layer : Design Issues : Virtual Circuits and Datagram, Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : Internet address, classful address. Routing algorithms: Optimality principle, Shortest path routing – Dijkstra, bellman-ford, flooding and broadcasting, distance vector routing, link state routing, flow based routing, multicasting, routing.	18
V	Transport Layer : Services & Protocols (TCP and UDP), congestion control Presentation and Application Layer : Presentation concepts, Cryptography: Substitution and transposition, ciphers Application Layer: Network Security, DNS, SNMP, E-mail, WWW, Network Multimedia Applications..	18



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BA VI Semester

DSE

Part- B: Content of the Course Multimedia Tools and Applications		
Total No. of Lectures =60 (in hours per week) :2-0-0		
Unit	Topics	No. of Lectures
I	Introduction to Multimedia: Basic Concept, Definition, Components & Applications of Multimedia; Hypermedia and Multimedia; Multimedia Hardware and Software; Multimedia Software Tools; Presentation Tools.	12
II	Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext. Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, Basic steps for image processing, Color Management	12
	System (CMS), natural light & colors, computerized colors, color palettes, image file formats.	
III	Digital Audio and Video: Characteristics of sound and Digital audio, Digital Audio systems, MIDI, Audio file formats, Characteristics of digital video, Using Audio in Multimedia Applications. Quantization and Transmission of Audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM; DM; ADPCM.	12
IV	Multimedia Authoring: Introduction, Features, Types of Authoring Tools: Card or Page-Based, Icon-Based, Time-Based, Object-Oriented; Multimedia tool selection, Tool feature, selecting the right authoring paradigm.	12
V	Compression Techniques: Introduction, Lossless Compression Techniques, Huffman Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy Compression Techniques, JPEG image compression, Audio compression, Video compression.	12
Part C: Learning Resource		
Text Books, Reference Books, Other resources		
Suggested Readings:		
1. Ramesh Bangia, "Multimedia and Web Technology", Firewall Media. 2. P. K. and Leigh, Kiran Thakrar Multimedia System Design. 3. Ana Weston Solomon, "Introduction to Multimedia", Tata McGraw-Hill.		



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BA VI Semester

DSE

Internet and its Applications		
TotalNo.ofLectures =60(inhours per week):2-0-0		
Unit	Topics	No. of Lectures (1 hour each)
I	Evolution of Internet, TCP/IP: addressing and routing.Internet applications: FTP, Telnet, Email, Chat.World Wide Web: HTTP protocol. Internet Concept of Internet Applications of Internet Connecting to the Internet Troubleshooting Communication using the Internet Concept of Internet; Applications of Internet, Understanding of Internet of things; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting.	12
II	Basics of Computer networks; LAN, WAN; Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities. Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite. LAN Topologies: Ring, bus, star, mesh and tree topologies. Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router.	12
III	Introduction Objectives World Wide Web (WWW) Web Browsing Softwares Popular Web Browsing Softwares Search Engines Popular Search Engines / Search for content Accessing Web Browser Using Favorites Folder Downloading Web Pages Printing Web Pages Understanding URL Surfing the web Using e-governance website Basics of E-mail What is an Electronic Mail Email Addressing Using E-mails Opening Email account Mailbox: Inbox and Outbox Creating and Sending a new E-mail Replying to an E-mail message Forwarding an E-mail message Sorting and Searching emails Document collaboration Instant Messaging and Collaboration Using Instant messaging Instant messaging providers	12
IV	HTML5 syntax, validation, elements, variety of input elements and attributes, Forms and Form widgets/elements (menus, sliders, etc.), tables, images, hyperlinks, directory navigation notation, div and span elements, HTML5 semantic elements like headers. Browser variations. Use of AFS environment and Secure Shell.Use of high-level HTML editorslike Expression Web for implementation and self-instruction.	12
V	PHP for server-side scripting and database interaction, syntax, interaction with HTML Forms, scripts as intermediaries to background databases. Design and implementation of programmer defined functions. Embedded SQL queries, use in 3-tier applications, diagnosing errors, syntax checking tools, debugging. PHP versus MySQL versus HTML errors in PHP scripts. HTML wrappers for database content. Miscellaneous other PHP features. Brief introduction to HTTP, domain names, ports, TCP connections, connecting to a remote host in telnet, UNIX terminal window and commands, GET and POST commands, HTTP message headers and message bodies, understanding the usefulness of HTTP headers.	12