



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		

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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 I

OFFICE AUTOMATION

CO. No.	Course Outcomes	Cognitive Level
CO 1	Gain hands-on skills in MS Windows, MS Word, MS Excel, MS Access, and MS PowerPoint.	U
CO 2	Automate routine office tasks using spreadsheets and macros.	U
CO 3	Design well-structured documents with advanced formatting techniques.	U, Analyze
CO 4	Develop professional presentations with animations and transitions.	Apply
CO 5	Integrate traditional Indian knowledge systems into office automation workflows.	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)
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BA II SEMESTER

MAJOR PAPER I

OFFICE AUTOMATION

Maximum Marks: 70

Units	Topics	No of Lecture
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 (<i>Nyaya, Mimansa</i>) 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
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.	10
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, 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; Creating and Modifying Page Numbers, Creating Headers and Footers, 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.	10



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IV	<p>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 and without wizard, field name, data types & properties, adding & deleting fields, renaming fields & their caption, resizing fields, primary key field & indexing fields.</p> <p>MS Access Form: Form wizard, Saving & Modifying forms, Entering & Editing data, Finding, sorting & displaying data, creating queries using select queries and wildcards.</p> <p>MS Reports: Creating reports, Previewing reports, Printing reports, modifying & Saving reports.</p>	15
V	<p>Creating Excel Worksheets Entering and Editing Cell Entries: Excel Application Window, Workbooks and Worksheets, Moving the Cell Pointer, Entering Text and Numbers.</p> <p>Working with Numbers: Creating Formula, 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.</p> <p>Other Formatting Options: Aligning Text, Border and Color. Printing in Excel: Print Preview, Changing Page Setup.</p> <p>Advanced Techniques in Excel: Using Functions and References; Use of Functions, Entering Functions, Relative and Absolute Cell References. Creating Easy-to-Understand Charts; Pie Charts, Series Charts, Creating Charts, Moving, Sizing and Printing Chart Objects.</p> <p>Macros: Creation of Pivot Table to analyze worksheet data.</p> <p>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.</p>	15

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.



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List of Practical

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. Access Database, generate report and label.
9. Creating, editing, saving, printing, securing & protecting operations of an Excel spreadsheet.
10. To prepare different types of charts in Excel.
11. To create students' data for identity cards along with photos, signatures, etc., and print it.
12. To create bar chart & pie chart in Excel for analysis of five years' results of your institute.
13. Applying themes and layouts to PowerPoint slides and inserting pictures, graphics, shapes, and tables into presentations.
14. To create PowerPoint slides using transitions and animations, working with master slides.



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BA II SEMESTER MAJOR

PAPER II

Object Oriented Programming using C++

CO. No.	Course Outcomes	Cognitive Level
CO 1	Develop simple algorithms and flow charts to solve a problem with programming using top down design principles.	U
CO 2	Writing efficient and well-structured computer algorithms/programs	U
CO 3	Learn to formulate iterative solutions and array processing algorithms for problems.	U, Analyze
CO 4	Use recursive techniques, pointers and searching methods in programming.	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)
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Object Oriented Programming using C++

Theory

Total No. of Lectures: 60 Hrs.

Maximum Marks: 70

Units	Topics	No. of Lectures
I	<p>Indian Knowledge System (IKS) and Programming Concepts Ancient Indian contributions to mathematics and logic (Aryabhata, Brahmagupta) and their relevance to computational models.</p> <p>Concepts of structured problem-solving in Indian logic (Nyaya, Mimansa) and their influence on algorithmic thinking. Traditional knowledge classification systems and their parallels in modern databases and file structures.</p> <p>Introduction to Programming - Program Concept, Characteristics of Programming, Stages in Program Development, Algorithms, Notations, Design, Flowcharts, Types of Programming Methodologies.</p> <p>Basics of C++: A Brief History of C++, Application of C++, Compiling & Linking, Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator.</p>	12
II	<p>Conditional Statements if construct, switch-case construct.</p> <p>Iterative Statements: while, do-while, and for loops, use of break and continue in loops, Using Nested Statements (Conditional as well as Iterative).</p> <p>Functions In C++: The Main Function, Function Prototyping, Call by Reference Call by Address Call by Value, Return by Reference, Inline Function, Default Arguments, Constant Arguments Function Overloading, Function with Array.</p>	12
III	<p>Classes & Objects: A Sample C++ Program with class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions, Virtual functions, Returning Objects, Constant member functions, Pointer to Members, Local Classes.</p>	12
IV	<p>Constructor & Destructor: Constructor, Parameterized Constructor, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor and Destructor.</p> <p>Inheritance: Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance.</p>	12
V	<p>Various types of Classes: Virtual Base Classes, Abstract Classes, Constructor in Derived Classes, Nesting of Classes.</p> <p>Operator Overloading & Type Conversion, Polymorphism.</p> <p>Streams: C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output with Manipulators, Exception Handling.</p>	12

Textbooks:

- Gerard G. Emch, R. Sridharan, M. D. Srinivas: Contributions to the History of Indian Mathematics, Hindustan Book Agency, Vol. 3, 2005.
- Udayan S. Patankar & Sunil M. Patankar: Elements of Vedic Mathematics, TTU Press, Tallinn 2018.
- J. R. Hanly and E. B. Koffman, —Problem Solving and Program Design in C++, Pearson, 2015.
- E. Balguruswamy, "C++ ", TMH Publication ISBN 0-07-462038-X
- Herbert Schildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7.



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Practical List

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.
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. Write a program to implement single inheritance with base and derived classes.
11. Implement a program to demonstrate multiple inheritance.
12. Implement polymorphism by demonstrating function overloading.
13. Write a program to implement operator overloading (unary and binary operators).



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BA II SEMESTER

MINOR

PAPER OPERATING SYSTEM

CO. No.	Course Outcomes	Cognitive Level
CO 1	Understand the fundamental concepts, structure, and functions of operating systems.	U
CO 2	Learn process management, memory management, file system organization, and device management.	U
CO 3	Gain practical experience with system calls, process scheduling, and resource allocation.	U, Analyze
CO 4	Explore security mechanisms, system protection, and synchronization techniques.	Apply
CO 5	Understand traditional Indian computational logic and knowledge systems related to problem-solving.	U

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

MINOR

OPERATING SYSTEM

Maximum Marks: 70

Units	Topics	No of Lecture
I	Indian Knowledge System (IKS) and Computational Logic in OS Traditional Indian contributions to problem-solving techniques, computational models, and logic systems (<i>Nyaya, Mimansa</i>); Ancient methods of resource allocation and scheduling; Parallels between Indian mathematical algorithms and modern scheduling techniques; Application of structured Indian problem-solving methods in modern computing environments.	10
II	Introduction to Operating Systems & System Structures Definition, history, and evolution of operating systems; Types of operating systems: Batch, Time-sharing, Distributed, Real-time, Multiprocessor, Mobile OS; OS components: Kernel, Shell, System Calls, User Interface; OS architecture: Monolithic, Layered, Microkernel; Services provided by OS; Booting process	10
III	Process Management & CPU Scheduling Concept of process, process control block (PCB), process states, process operations; Threads and multithreading; Process scheduling algorithms: FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling; Context switching; Inter-process communication (IPC); Process synchronization: Semaphores, Mutex, Deadlocks, Deadlock prevention and recovery.	10
IV	Memory Management & Virtual Memory Memory hierarchy, contiguous memory allocation, paging, segmentation; Virtual memory concepts, demand paging, page replacement algorithms: FIFO, LRU, Optimal; Thrashing; Memory allocation techniques: Buddy System, Slab Allocator.	15
V	File Systems & I/O Management File system structure, file attributes, file access methods, file allocation strategies (contiguous, linked, indexed); Directory structure, file system mounting, file system interface; Disk scheduling algorithms: FCFS, SSTF, SCAN, C-SCAN; RAID levels and storage management. Security, Protection, and Emerging Trends in Operating Systems OS security concepts, authentication, access control, threats and vulnerabilities, intrusion detection; Cryptographic techniques, security policies; System protection mechanisms; Introduction to cloud operating systems, mobile OS, and real-time operating systems.	15

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. Dhamdhere (McGraw-Hill).



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List of Practical

1. Write a shell script to display system information (OS name, kernel version, CPU details).
2. Execute basic Linux/Windows commands like `ls`, `mkdir`, `cp`, `mv`, `rm`.
3. Write a program to implement the First-Come-First- Serve (FCFS) scheduling algorithm.
4. Implement the Shortest Job First (SJF) CPU scheduling algorithm.
5. Develop a program for Round Robin Scheduling with a given time quantum.
6. Implement a File Allocation Table (FAT) Simulation.
7. Write a program to demonstrate Encryption & Decryption using basic cryptographic algorithms.



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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	
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Practical	2	40	60	100
Total	6			200

Evaluation Scheme

	Marks	
	Internal	External
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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, Cursor Triggers, Stored Procedures and functions.	12
V	Functional Protection and Crash Recovery: protection against crashes: different type 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
6. Books published by M.P. Hindi Granth Academy, Bhopal



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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 Evangelospetroutsos- 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 Evangelospetroutsos- 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: Major/Minor/Elective

Subject:- Introduction to ASP.NET& C#

List of Practical

1. Develop a console application in c# to find the addition of two numbers.
2. Develop a console application in c# to find the simple interest.
3. Develop a console application in c# to find the factorial of any n entered number.
4. Develop a console application in c# to display a Fibonacci series.
5. Develop a console application in c# to check whether a number is even or odd.
6. Develop a console application in c# to implement array.
7. Develop a console application in c# to find the product and division of entered number.
8. Write a program to declare a class "staff" having data of the members such as name and post. Accept this data and display the result.
9. Define a class having "salary" of members displaying variables such as BASIC, DA, HRA. Develop a window application to find the total salary of the employee.
10. Develop a window application using text box, check box, radio button, list box, labels and validation.



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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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List of Practical of JAVA

1. Write a program to print number in words using Nested if and Switch case.
2. WAP called Odd Even which prints —odd number|| if the int variable —number|| is odd or —even number|| otherwise.
3. WAP to find sum and average of 10 number using array.
4. WAP to display reverse of a number digit using arrays.
5. WAP to display grade according to the marks obtained by the student.
6. Find the factorial of a given number.
7. WAP to print Fibonacci series.
8. WAP to implement method overloading.
9. WAP to design a class using abstract method and classes.
11. WAP to implement parameterized constructor with default argument.
12. WAP to implement multiple inheritance.



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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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DST-FIST Supported & STAR College Scheme by DBT

Bachelor of Arts (B.A.)

SUBJECT: COMPUTER APPLICATION

B.A. VI Semester

Paper-DSE

Multimedia Tools and Applications

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	To understand various concept of Multimedia	U, A
CO 2	To understand the software used for Multimedia	K
CO 3	Would be able to create and design documents with text and graphics like newspaper, ad, wedding cards, visiting cards, greeting cards etc.	U
CO 4	Would be able to create and design the images and graphics.	U, Analyze

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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Content of the Course

Theory

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

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Introduction to computer graphics and multimedia, multimedia elements: text, images, sound, animation and video, raster and vector graphics, file formats, color models, basics of printing process, multimedia hardware and software requirements, multimedia tools, Applications of Multimedia.	12
II	Introduction to photoshop: Screen and Work Area, Opening a File, Tool Box: Marquee Tool, Magnetic Tool, Slice Tool, Patch Tool, Clone Stamp Tool, Gradient Tool, Smudge Tool, Blur Tool, Text Tool, Setting History Option, Use of Layers, Background layer, Filters: Using Filter Gallery, Animation using Image-Ready.	12
III	Introduction to CorelDRAW workspace, toolboxes, dockers, rulers, Page setup: size, orientation, margins, and layout, Drawing basic shapes (rectangles, ellipses, polygons), Working with Freehand, Bezier, and Pen tools, Node editing and shaping objects (Weld, Trim, Intersect), Using Artistic Media tools.	12
IV	Working with Text: Paragraph text vs. Artistic text, Text formatting, alignment, and spacing, Fitting text to paths and frames, Color palettes, RGB vs. CMYK modes, Uniform fill, fountain fill, pattern, and texture fills, Applying transparency, drop shadows, contours, and 3D effects, Bitmap effects and color separations, Grouping, ungrouping, locking, and ordering objects, Align and distribute, transformation (rotate, scale, skew), Using layers and tables.	12
V	History and Versions of Page Maker, Creating a new Page, document setup dialog box, paper size, page orientation, margins, different methods of placing text and graphics in a document. Master Page, story editor, Different screen Views, Importing text /Pictures, formatting of text, indent, leading, hyphenation, spelling check, creating index, text wrap, position (Superscript/subscript), control palette.	12

References

Text Books:

- "DTP Course Book: A Complete Text-book of Desktop Publishing for Everyone" by Vishnu Priya Singh & Meenakshi Singh (Covers PageMaker 7, CorelDRAW 12, Photoshop CS).



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Reference Books:

- "Mastering Desktop Publishing: A Complete Guide to PageMaker, CorelDRAW, and Photoshop" by Neeruv Kumar Dogra.
- "DTP Course: A Complete Book for PageMaker, CorelDRAW, Photoshop" by Ascent Prime Publication.
- "Desktop Publishing for Beginner" by Dr. Pankaj Dadhich (Covers Pagemaker, Photoshop, CorelDraw).

List of Practical

1. Design Birthday Greeting Card in Photoshop.
2. Design Id Card in Photoshop.
3. Create a collage using photoshop on the theme Friends.
4. Create an animated image using image ready.
5. Create a business (visiting)card for yourself in Corel Draw.
6. Create a poster for Independence Day in CorelDraw.
7. Create a banner for college event in Corel draw.
8. Use the master page feature of CorelDraw and create header and footer.
9. Design a front page of magazine in Adobe PageMaker
10. Design a brochure in Adobe PageMaker.





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B.A. VI Semester

Paper-DSE

Internet and its Applications

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	To understand various concept of Internet.	U, A
CO 2	To understand the HTML used for Web Designing.	K
CO 3	To understand various concept of Computer Networking.	U
CO 4	To understand the used of PHP.	U, Analyze

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 VI Semester

Paper-DSE

Internet and its Applications

Theory

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Evolution of Internet. TCP/IP: addressing and routing Internet applications: FTP, Telnet, Email, Chat. World Wide Web: HTTP protocol, Concept of Internet, Applications of Internet, Connecting to the Internet, Troubleshooting Communication using the 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 Software's Popular Web Browsing Software's 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 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 editor like 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, GET and POST commands, HTTP message headers and message bodies, understanding the usefulness of HTTP headers.	12

Textbooks:

- Gerard G. Emch, R. Sridharan, M. D. Srinivas: Contributions to the History of Indian Mathematics, Hindustan Book Agency, Vol. 3, 2005.
- Udayan S. Patankar & Sunil M. Patankar: Elements of Vedic Mathematics, TTU Press, Tallinn 2018.
- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015.
- E. Balguruswamy, "C++ ", TMH Publication ISBN O-07-462038-X
- Herbert Schildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7.





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BA VI Semester

DSE

Internet and its Applications

List of Practical

1. Understanding by demonstrating various guided media: Twisted pair, Coaxial cable, optical fiber.
2. Understanding by demonstrating various LAN topologies.
3. Hands on working with internet and its applications (understanding of web browsing software and email).
4. Create HTML document with following formatting- bold, italics, underline, colors, headings, title, font, background, paragraph, marquee text.
5. Create HTML document with ordered and unordered list, inserting images, internal and external linking.
6. Write a PHP program to print "hello php".
7. Write a PHP program and take values from the user and compute sum, subtraction, multiplication, division and exponent of value of the variables.
8. Write a PHP program to find area of following shapes: circle, rectangle, triangle, square.
9. Write a PHP program to print multiplication table of a number input by the user.
10. Write a PHP program to calculate sum of natural numbers from one to n number.