GOVT. M. H. COLLEGE OF HOME SCIENCE & SCIENCE FOR WOMEN (AUTONOMOUS), JABALPUR (M.P.)

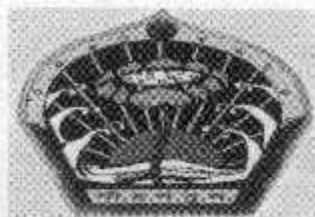# UG SYLLABUS
SESSION 2023-2024

COMPUTER APPLICATION

Department of Mathematics & Computers

COMPUTER APPLICATION

B.sc I Year

PAPER	TITLE	CREDIT
Major Paper - I	Programming in C language	Th - 4 credit, pra. - 2 credit
Paper – II / Minor / Elective	Data Processing Software	Th - 4 credit, pra. - 2 credit

B.sc II Year

PAPER	TITLE	CREDIT
Major Paper - I	Database Management System	6 credit
Paper – II / Minor / Elective	Introduction to ASP.NET& C#	Th - 4 credit, pra. - 2 credit

B.sc III Year

PAPER	TITLE	CREDIT
Group A Paper - I	Operating System	6 credit
Group A Paper - II	Computer Networks	6 credit
Group B Paper - I	Programming in Java	Th - 4 credit, pra. - 2 credit
Group B Paper - II	Multimedia Tools and Applications (Theory)	Th - 4 credit, pra. - 2 credit
Minor	Internet and its Applications (theory)	Th - 4 credit, pra. - 2 credit

Academic Council
Approved
25.07.23

Nidhi Cho
Professor & He
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& Science for Women

Govt. M.H. College of Home Science & Science for Women (Autonomous) Jabalpur (M.P.)
Department of Mathematics & Computer
Session 2023 - 2024
B.sc I Year
Paper I
Subject- Computer Application
Course Title – Programming in C language

Part – B Content of the Course Programming in C language (Practical)		
Total No. of Lectures = 60 (2 hours/lecture per week) : 2-0-0		
Unit	**Topics**	**No.of Lectures**
I	**Programming Fundamental** : Program Concept, C language: Introduction history of C, Over view of procedural programming and object oriented programming, structure of C program, Algorithms, Flow Charts Symbols, Rules for making Flow chart, Types of flowchart, techniques of problem solving : Programming Techniques - Top down, Bottom up, Modular ,Structured -Features, Merits & Demerits, Programming Logics- Simple Branching, Looping ,Recursion, Cohesion & Coupling, Programming Testing & Debugging their Tools.	12
II	**Programming in C** including features of 'C', C tokens, Variables, Expressions, Identifiers, Keywords, Data Types, Constants, Operator: Arithmetic, Logical Relational, Conditional and Bit wise Operations, Precedence and Associatively of Operators,evaluations of expressions. Types conversions in. expressions ,Basic input /output and library functions : Single character input/output i.e. getch(), getchar(),getche(),puts(),putch() and putchar (), Formatted input output i.e.printf() and scanf(). Decision Making Branching: if-else ,switch Conditional operator & goto statement If statement, If...Else statement, Nesting of IF....Else Statement, else if ladder, ?: operator, go to statement ,Switch statement, Compound statement, Looping : Introduction, while statement, do statement, for statement, Break and Continue, do-While loops.	12
III	**Functions:** Utility of functions, Call by value & call by reference, categories of function (i) Introduction (ii) User defined function and library functions, Categories of User defined functions, Return values and their types, Calling a function, Void functions, Differentiating between declaration and definition of function argument/ parameter in functions, functions with variable number of arguments, recursion, function arguments, Return values and nesting of function, Recursion, Calling of functions, Scope and life of variable - local and global variable, Storage class - auto, extern static, register. **Arrays** : what is array, declaring, initializing ,accessing individual elements in an array ,manipulating array elements using loops, 2D and 3D arrarys, String : declaration, string functions - strcat, strcpy,strcmp.strlen.strstr.	12
IV	**Pointers:** operations on pointers, Basic of pointers and operators, Accessing the address of variable, Declaring and initializing pointers, Accessing a variable through its pointer, Pointer expressions,pointers and functions, Array of pointers, Pointer and strings, Pointer to structure, Pointers within structure, preprocessor, #define, defining, functions like macros, #error, #include, conditional compilation directives i.e.#if,#else,# elif #and #ifdef & undef . **Structures** : Structure definition declaring and initiazlizing Structure variables, the Structures tag, period operator, accessing Structure members, Copying & Comparison of structures, the concept of structure of structure, array of structure, structure and pointer, arrow operator and nesting of structure, Unions: initialization and use of it in a program .	12
V	**File Management: Introduction** - File handling, File structure, File handling function, File types, Streams, Text, Binary, File system basics, The file pointer, Opening a File, Closing a file, Writing a character, Reading a character, Using fopen() ,getc() putc(),and fclose(),Using feof() Working with string fputs() and fgets(),Standard streams in C, Flushing a stream Using fread() and fwrite() ,Direct access file, fseek() and random access I/O, fprintf() and fscanf(), Command line arguments.	12

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Dr. Geeta Shrivastava   Dr. Binay Singh   Mr. Anurag Singh

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Dr. Sudipta Sanyal   Dr. S.S. Shrivastava   Ms. Aarti Chouksey

Dr. Nidhi Choubey

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Session 2023 – 2024
B.sc I Year
Paper I
Subject- Programming in C language

Part C : Learning Resources	
Suggested Digital Platforms, Web links 1. https://beginnersbook.com/2014/01/c -pointers/ 2. http://www.programiz .com /c-programming/c-if-else- statement 3. https://javatutoring.com/control-statement -in-c/ 4. https://www.programiz .com /c-programming/c-array 5. https://www.tutorialspoint.com/cprogramming/c_structures.htm 6. https://www.beginnersbook.com/2014/01/c-functions-examples/ 7. https://www.javatpoint.com/data -types-in-c **Suggested Readings:** 1. The C Programming Language : B.W.kernighan & D.M.Ritchie 2. The Sprit of C: Cooper,Mulish 3. Programming in ANSI-C:E.Balagurusami,TMH Publication 4. Programming in C: Schaum Outline, McGraw-Hill 5. Let us C: Kanetkar Y 6. Pointers in C: Kanetkar Y 7. An introduction to C programming - Amit Saxena,Anamaya Publishers, New Delhi	

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Department of Mathematics & Computer
Session 2023 – 2024

B.sc I Year

Paper I

Subject- Computer Application

Course Title - Programming in C language

Part - B Content of the course
Programming in C language (Practical)
Total No. of Labs =30 Labs each of 2 hours duration (1 lab per week)
Practical Lab will be conducted based on the theory Syllabus

List of Practical

1. Write a Program to print different data types in 'C' and their ranges.
2. Write an Algorithm & Flowchart to convert temperature from Celsius to Fahrenheit.
3. Write an Algorithm & flowchart to find the smallest and largest number of among the three numbers.
4. Write a program to calculate simple and compound interest.
5. Write a C program to find the roots of a quadratic equation.
6. Write a C program to make a simple calculator using switch........case.
7. Write a C program to print natural numbers from 1 to n.
8. Write a C program to find the factorial of a given number.
9. Write a program in C to check a given number is even or odd using the function.
10. Write a C program to access elements of an array using pointers.
11. Write a C program to calculate the average of array elements.
12. Write a C program to store information of 10 students using structures.
13. Add two complex numbers by passing structures to a function.
14. Write a C program to find the length of a string.
15. Write a C program to reverse a string using recursion.
16. Write a C program to find largest element in an array.
17. Write a C program to add two matrices using multi-dimensional arrays.
18. Write a C program to store information of students suing structure.
19. Write a C program to swap two numbers using pointers.
20. Write a C program to print Pyramids and Patterns.
21. Write a C program to read and write to a text file.

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Department of Mathematics & Computer
Session 2023 – 2024
B.sc I Year
Paper I
Subject- Computer Application
Course Title - Programming in C language

	Part- C **Learning Resources**	
	Suggested Digital Platforms, Web links 1. https://beginnersbook.com/2014/01/c-pointers/ 2. https://www.programiz.com/c-programming/c-if-else-statement 3. https://javatutoring.com/control-statements-in-c/ 4. https://www.programiz.com/c-programming/c-arrays 5. https://www.tutorialspoint.com/cprogramming/c structures.htm 6. https://beginnersbook.com/2014/01/c-functions-examples/ 7. https://www.javatpoint.com/data-types-in-c **Suggested Readings:** 1. The C programming Language : B.W. Kernighan & D.M. Ritchie 2. The sprit of C : Cooper, Mullish 3. Programming in ANSI-C : E. Balagurusami, TMH publication 4. Programming in C : Schaum Outline, McGraw-Hill 5. Let us C : Kanetkar Y 6. Pointers in C : Kanetkar Y 7. An introduction to C programming-Amit Saxena, Anamaya publishers, New Delhi	

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Dr. Nidhi Choubey
Head of the Department

PART B: Content of the Course		
Data processing Software		
Total No of Lecuture = 60 (2 hours/lecture per week) : 2-0-0		
Unit	**Topics**	**No. of Lectures**
I	**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; Shortucts Autostarts; Accessories and Windows Settings using Control Panel; Start button & Program lists; Installing new Hardware & Software.	08
II	**Basic Of MS Word:** Creating Word documents: The Word Window, Entering Texts, Editing Document texts, Copying and moving Texts, Applying Text Enhancements; Applying Fonts and Font style in word, Highlighting Text for Distinctive look. Aligning and Formating ; Aligning Text using identification options, Setting Line Spacing Options using Tabs Creating lists Number 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 ,Priting Options. Advanced Formatting Techniques in Word.Formatting Pages; Formatting Sections,Creating and Modifying page Numbers, Creating Headers and Fooders, Taking Care of Loose Ends, Working 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	16
III	**MS Access** Concepts & terms : database tables, relational database, records, fields ,Controls & objects, queries, forms, reports, properties, wizards, macros, MSAccess requirements , starting & quitting MSAccess, MSAccess worspace,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. MSA ccess Form: Form wizard, Saving & Modifying forms Entering & Editing data, Finding, sorting & displaying data creating queries, using select queries and wild cards. MS Reports : Creating reports, Previewing reports, Printing reports, modifying & Saving reports. Relational database: definition ,purpose, creation, viewing deleting. Expressions, Create PivotTable or PivotChart views in an Access desktop database.	12
IV	**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, Selection Worksheets, Copying and Moving Worksheets, Inserting and Deleting Worksheets, Other Formatting Options ; Aligning Text, Border and Colour, 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. Create 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.	16
V	**Creating Power Point Presentations:** Creating a Basic Presentation, Building Presentatins, Modifying Visual Elements, Formatting and Checking Text, Adding Objects, Applying Transitions, Animation Effects and Linking, Preparing handouts.	08

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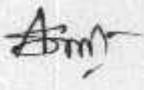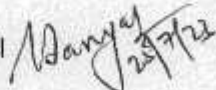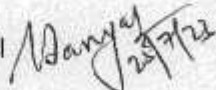
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Department of Mathematics & Computer
Session 2023 – 2024
B.sc I Year
Paper II
Subject- Computer Application
Course Title – Data Processing Software
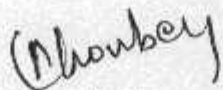
Part C: Learning Resources

Suggested Digital Platforms, Web links

1. Https://www.webucator.com/how-use-mail-merge-microsoft-word.cfm
2. https://support.microsoft.com/en-us/office/create-pivottable-or-pivotchart-views-in-an-access-desktop-databse-83e524df-dfbd-456d-0dd0-0a48claa6752
3. https://support.microsoft.com/en-us/office/create-a-pivottable-to-analyze-worksheet-data-
4. a9a84538-bfe9-40a9-a8e9-f99134456576
5. https://www.youtube.com/watch?v=Zv3XMBb3V6A
6. https://www.digimat.in/nptel/course/video/121106007/L12.html

Suggested Readings:

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

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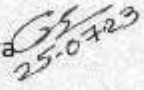Head of the Department

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Govt. M.H. College of Home Science & Science for Women (Autonomous) Jabalpur (M.P.)
Department of Mathematics & Computer
Session **2023 – 2024**
B.sc I Year
Paper II
Subject- Computer Application
Course Title – Data Processing Software

PART- B
Content of the Course
Data processing Software (Practical)

Practical Lab will be conducted based on the theory Syllabus

M S Office Practical

1. To create a document and insert header and footer, page title, page numbers.
2. Insert a table, picture, clip art and chart into the documents.
3. To create a document for writing mathematical equations.
4. To create a document, set the margins, orientation, size, column, water mark, page color and page borders.
5. To create a document using mail merge by connecting data base.
6. To print an invitation letter using mail merge.
7. To design a table, form and report in Access.
8. To design Queries and macro in Access.
9. To get external data from elsewhere and move to Access.
10. Access Data base, generate report and label.
11. To encrypt Data base with pass word in Access.
12. Creating, editing, saving, printing, securing & protecting operations of an excel spreadsheets.
13. To Prepare different types of charts in Excel
14. To create student's data for identity card along with photo, sign etc. and print it.
15. To create bar chart & pie chart in Excel for analysis of five year's results of your institute.
16. To prepare an attendance sheet of 10 students for any 6 subjects of your syllabi. To calculate their total attendance, total percentage of attendance of each student & average of attendance.
17. To create Pivot Table using multiple sources of data in Excel.
18. Applying themes and layouts to power point slides and inserting pictures, graphics, shapes, and tables into presentations.
19. To create power point slide make using transitions and animation, working with master slides.
20. To create a professional slide for presentation in power point.

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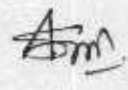
Dr. Nidhi Choubey
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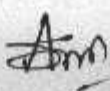Dr. Nidhi Choubey
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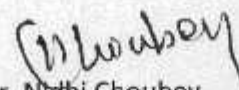**Course Title – Data Processing Software**

Part-C
Learning Resources

Suggested Digital Platforms, Web links

1. https://www.webucator.com/how-to/how-use-mail-merge-microsoft-word.cfm
2. https://support.microsoft.com/en-us/office/create-pivottable-or-pivochart-views-in-an-access-desktop-database-83e524df-dfbd-456d-9dd0-0a48c1aa6752
3. https://support.microsoft.com/en-us/office/create-a-pivottable-to-analyze-worksheet-data- a9a84538-bfe9-40a8e9-f99134456576
4. https://www.youtube.com/watch?v=Zv3XMBb3V6A
5. http://www.digimat.in/nptel/courses/video/121106007/L12.html

Suggested Readings:

1. Microsoft Office 97 : Will Train, Gini Courter, Annette Marquis, BPB Publication.
2. Microsoft Office 2000 : Gini Courter & Annette Marquis, BPB Publication.
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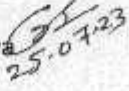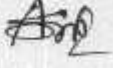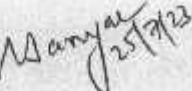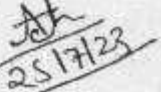Dr. Sudipta Sanyal   Dr. S.S. Shrivastava   Ms. Aarti Chouksey
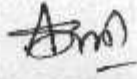
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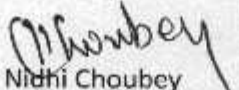& Science for Women, Jabalpur

Govt. M.H. College of Home Science & Science for Women (Autonomous) Jabalpur (M.P.)
Department of Mathematics & Computer
Session 2023 – 2024
B.sc II Year Subject- Computer Application
Course Code – S2-COAP1T
Course Title – Database Management System

Unit	Topics	No. of Lectures
PART B: Content of the Course **Database Management System** **Total No of Lecuture = 90 (in hours per week) : 3-0-0**	
I	**Introduction :** Database systems concepts, Data base system, Advantages of database system; Data Architecture of data system: View/Schema, logical, conceptual and physical and their interrelationship DDL, DML and data dictionary, Data base administrator. 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.	18
II	Relational, Hierarchical and Network Model their advantages and disadvantages, storage organization for Relations. Rational Model : Structure tupple Attributes, Normalization : First, Second, Third & BCNF Normal Forms, Key, primary key, Candidate key, Integrity rules : Entity integrity, Referential integrity rule.	18
III	Relational algebra : select, project, cross product, different types of joins i.e. theta join, equi join, natural join, outer join, set operations definition of union, set difference, Cartesian product, selection, intersection, relational query language.	18
IV	Relational query language :- Data Manipulation in DBMS, Data types, SQL commands, DDL, DML, DCL, TCL syntax and examples. Computation on table data, Advance SQL:- Relational set operations, 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.	18
V	FUNCTIONAL PROTECTION AND CRASH RECOVERY: protection against crashes: different types of crashes; backup, journal, rollback, committed and uncommitted transactions, security on database. Transaction concept, Transaction state, serializability security or Database: user identification. Physical Protection and maintenance.	18

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Govt. M.H. College of Home Science & Science for Women (Autonomous) Jabalpur (M.P.)
Department of Mathematics & Computer
Session 2023 – 2024
B.sc II Year
Subject- Computer Application
Course Title – Database Management System

Part C : Learning Resources

Suggested Digital Platforms, Web links

1. https://www.greatlearning.in/academy/learn-for-free/courses/database-management-system-dbms
2. https://www.learnvern.com/course/database-management-tutorail-hindi
3. https://www.geeksforgeeks.org/dbms/
4. https://www.tutorialspoint.com/database_tutorials.htm
5. https://www.javatpoint.com/dbms-tutorial
6. https://beginnersbook.com/2015/04/dbms-tutorial/
7. https://www.studyonight.com/dbms/
8. https://www.w3schools.in/dbms/
9. https://www.guru99.com/dbms-tutorial.html
10. https://www.tutorailcup.com/dbms
11. https://www.mphindigranthacademy.org/

Suggested Readings :

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

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Session 2023 – 2024
B.sc II Year Subject- Computer Application
Course Code – S2-COAP2T
Course Title – Introduction to ASP.NET& C#
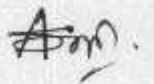
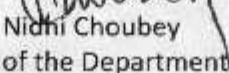| Unit	PART B: Content of the Course Introduction to ASP.NET& C# Total No of Lecuture = 60 (3hours/lecture per week) Topics	No. of Lectures
I	Introduction to .NET Framework: Programming Platform. NET Framework, .NET Architecture, CLR, the Just-in-Time Compiler, Garbage collection. .NET Framework class library. C# - The Basics and Console Application in C#: Introduction to C#.NET Development Environment, Visual development & event driven Programming Methods and events. Data type, type conversion. Variables, constants, operators, Decision making, Loops, Class, Object, Methods. Array, String manipulation.	12
II	Overview of OOPs: Encapsulation, inheritance, polymorphism, abstraction. Operator overloading. Creating and using Class Library, Creating User-Defined Classes. 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 window Forms Windows Forms Properties and Events Windows Form Controls, Menus – Dialogs – ToolTips.	12
III	Introduction to ASP.NET: Overview of ASP.NET framework, Application ASP.NET Life Cycle, page life cycle phases, Initialization, Instantiation of the controls on the page, Restoration and maintenance of the state. Understanding ASP.NET Controls, Applications Web servers, installation of IIS. Web forms, Web form controls, server controls, client controls, web forms & HTML.	12
IV	Programming in ASP.NET, Adding controls to a web form Buttons, Text BOX. Labels, Checkbox, Radio Buttons, List Box etc. States of ASP.NET: View State, Control State, Session State, Application State. Creating a multiform web project, running a web Application, Event Handling – Application and Session Events, Page and Control Events. Validation controls: RequiredFieldvalidates, RangeValidator, CompareValidator, RegularExpressionValidator, Custom Validator, ValidationSummary.	12
V	Database connectivity in ASP.NET: Architecture of ADO.NET, Connected and Disconnected Database. Create Connection using ADO.NET Object Model, Connection Class, Command Class, Data Adapter Class, and Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid binding standard web server controls. Display data on web form using Data bound Controls.	12

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Department of Mathematics & Computer

Session 2023 – 2024

B.sc II Year

Subject- Computer Application

Course Title – Introduction to ASP.NET& C#

Part C : Learning Resources

Suggested Digital Platforms, Web links

1. https://docs.microsoft.com/en-us/dotnet/framework/get-started/system-requirements
2. https://www.c-sharpcorner.com/UploadFile/18585c/overview-of-oops/
3. https://www.dotnettricks.com/learn/designpatterns/adapter-design-pattern-dotnet
4. https://www.mphindigranthacadmy.org/

Suggested Readings :

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

PART B : Content of the Course Introduction to ASP.NET & C# (Practical)

Total No. of Practical = 30 (each of 2 hours duration (1 Practical per week)

List of Practicals

1. Write a Program, create a simple console application in C#, learning of consecrating basic building blocks of a console application.
2. Write a Program for table lists the differences between Array and Array List in C#.
3. Write a Program to combine two arrays without duplicate values in C# using the Union () method.
4. Write a Program to remove duplicate values from an array in C# in Order to get distinct values.
5. Write a Program to count the total number of elements or some specific elements in the array using an extension method Count() method.

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Course Title – Introduction to ASP.NET& C#

6. Write a Program to get a comma-separated string from an array using String.Join() method.

7. Write a Program to sort a one-dimensional array in two ways using Array.Sort() method and LINQ query.

8. Write a Program to table lists, differentiate between Array and Array List in C#.

9. Write a Program to obtain two numbers from the user and display them but reject any input where both numbers are greater than 10 and ask for two new numbers.

10. Write a console application to obtain fourint values from the user and display the product.

11. Write an application that receives the following information from a set of students: Students Id: Student Name: Course Name: Date of Birth: The application should also display the information of all students once the data has been entered. Implement this using an Array of Structure.

12. Write Program using conditional statements and loops: Generate Fibonacci series.

13. Write Program using conditional statements and loops: Generate various patterns (triangles, diamond and other pattern) with numbers.

14. Write Programs using conditional statements and loops: Test for prime numbers.

15. Write a Program using function overloading to swap two integer numbers and swap two float numbers.

16. Write a Program to declare a class "staff" having data of the member such as name and post. Accept this data 5for atheist for 5 staff members and display the names of "staff" who are HOD.

17. Define a class, having "salary" of members displaying variables such as Basic, DA, HRA. Write a Program using Constructor with default values for DA and HRA and calculate the salary of employees.

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Department of Mathematics & Computer
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B.sc II Year
Subject- Computer Application
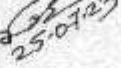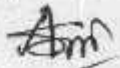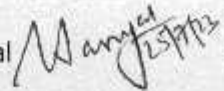**Course Title – Introduction to ASP.NET& C#**

18. Create a project that computes the total of fat, carbohydrate and protein. Allow the user to enter into the text boxes, the grams of fat, grams of carbohydrate and grams of protein assuming that each gram of fat is 9 calories and protein/ carbohydrate is 4 calories. Display the total calories of the food item in a label. Use other lables to display the accumulated sum of calories and the count of items entered. The food form should have 3 text boxes for the user to enter the grams of each category. Include labels next to each text box indicating what the user has entered.

19. Design the same webpages for BMS, BAF and UG students and apply the same background color for all the pages using css.

Part C : Learning Resourcse

Suggested Digital Platforms, Weblinks

1. https://docs.microsoft.com/en-us/dotnet/framework/get-stared/system-requirements
2. https://www.c-sharpcorner.com/UploadFile/18585c/overview-of-oops/
3. https://www.dotnettricks.com/learn/designpatterns/adapter-design-pattern-donet
4. https://www.dbit.ac.in/mca/syllabus/asp.net-lab.pdf
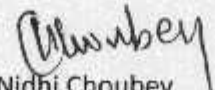5. https://www.mphindigranthacademy.org/

Suggested Readings:
1. ASP.NET Unleashed C# programming – Wrox Publication.
2. C# Programming Black Book by Matt Talles.
3.VB.NET Programming Black Book by stevenholzner – dreamtech publications.
4. Mastering VB.NET by Evangleospetroutsos-BPB publications
5. Introduction to .NET framework – Worx publication
6. Books published by M.P. Hindi Granth Academy, Bhopal

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Class	Subject	Year	Max. Marks	Min. Marks	Paper Title – [CA-301]
B.sc.	Computer Application	III	30+70	35	Operating System

S3 – COAP 1 D

	Part B: Content Of the Course	
	Operating System	
	Total No. of Lectures =90 (in hours per week) : 3-0-0	

Unit	Topics	No. of Lectures
I	Introduction: Evolution of operating systems, Types of operating systems, Different views of the operating system, operating system Concepts and structure. Processes: The Process concept, systems programmer's view of processes, operating system services for process management. Scheduling algorithms. Performance evaluation.	18
II	Memory Management : Memory management without swapping or virtual memory, page replacement algorithms, modeling paging algorithms, design issues for paging systems, segmentation. Inter-process Communication and Synchronization: The need for inter-process synchronization, mutual exclusion, semaphores, hardware sport for mutual exclusion, and queuing implementation of semaphores, classical problems, in concurrent programming, critical region and conditional critical region, monitors, messages. Deadlocks: Deadlock Prevention, deadlock avoidance.	18
III	File Systems: File systems, directories, file system implementation, security protection mechanisms. Input/output: Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software: Goals interrupt handlers, device drivers, device independent I/O software. User space I/O Software.	18
IV	Disks: Disk hardware, scheduling algorithms, Error handling, track-at-a-time caching, RAM Disks. Clocks: Clock hardware, memory mapped terminals, I/O software. Processes and Processors in Distributed Systems : Threads, System models, processor allocation, scheduling. Distributed File Systems: Design, Implementation, trends.	18

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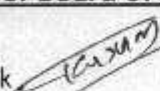
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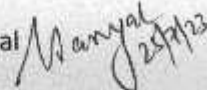
V	Architecture and working of Android, IOS and windows phone 8 operating system. Comparison of Android, IOS and window phone 8. What is Android & advantages and features of Android. Android development Tools:- Installing and using E clips with ADT Plug-in. Installing Virtual Machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools; Creating an Android project. User Interface Design - Form widgets, Text field, Basic views layouts, Button control and Images dialog. User interface Architecture- Application context, Activity life cycle, Multiple screens, Connecting with Database.		18

Part C: Learning Resources
Text Books, Reference Books, Other resources

Suggested Readings:

1. Android Programing - The Big Nerd Ranch Guide By Philips & Brain Hardy
2. Android Design Pattern - Interaction Design Solution for Developers By Greg Nudelman.
3. "Operating System Concepts" by Avi Silberschatz and Peter Galvin
4. "Operating Systems: Internals and Design Principles" by William Stallings
5. "Operating System: A Design-oriented Approach" by Charles Crowley
6. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforms, Web links

1. httQs:LLwww.greatlearning.in[academyLfearn-for- free[courses/linux-in-hindi
2. httQs:/Lwww.tutorialsQoint.com[oQerating system[index.htm
3. httQs://www .javatQoint.comLos-tutorial
4. httQs:LLtutorialsQoint.devLcomQUter-scienceL0Qerating- systems

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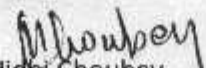
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Department of Mathematics & Computer
Session 2023 – 2024
B.Sc. III Year
Computer Networks (Theory) (Group-A Paper-II)

Class	Subject	Year	Max. Marks	Min. Marks	Paper Title – [CA-301]
B.sc.	Computer Application	III	30+70	35	Computer Networks (Theory) (Group-A Paper-II)

S3 - COA P2D   **Part- B Content Of the Course**
Computer Networks

Total No. of Lectures =90 (in hours per week) 3-0-0

Unit	Topics	No. of Lecture
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 reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission.	18
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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Session 2023 – 2024
B.Sc. III Year
Computer Networks (Theory) (Group-A Paper-II)

Part C: Learning Resources
Text Books, Reference Books, Other resources

Suggested Readings:

1. Computer Networks, A.S. Tannenbaum, 3rd Edition, PHI.
2. Data networks, Dimitri Bertsekas & Robert Gallager, PHI.
3. Data Networks: Concepts, Theory & Practices, Black, PHI.
4. Computer Networks & Distributed Processing. Martin J.. PHI.
5. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforms, Web links

1. https://nptel.ac.in/courses/106/105/106105183/
2. https://nptel.ac.in/courses/106/105/106105081/
3. https://onlinecourse.swayam2.ac.in/cec19_cs07/preview
4. https://www.mooc-list.com/course/computer-networks-coursers

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Department of Mathematics & Computer
Session 2023 – 2024
B.Sc. III Year
Programming in Java (theory) (Group-B Paper-I)

Class	Subject	Year	Max. Marks	Min. Marks	Paper Title – [CA-301]
B.sc.	Computer Application	III	30+70	35	Programming in Java (theory) (Group-B Paper-I)

	PartB:Content Of the Course Programming in Java	
	Total No.of Lectures =60 (inhours per week) -0-0	
Unit	Topics	No. of Lectures
I	Features of Java, Security 111 Java, Fundamental and features of Object Oriented Programming, C versus Java, Java Development Kit (JDK), Java Virtual machine(JVM) and Java Runtime Environment(JRE), How to Set Path in Java, **Keywords;** Working of Java; Including Comments; Data Types ıı Java; Primitive Data Types; Abstract / Derived Data Types; Variables in Java; Using Classes in Java; Declaring Methods in Java, Code to Display Test Value; The main() Method, Invoking a Method in Java; Saving, Compiling and Executing Java Programs	12
II	**Operators and Control Statements:** Operators, Arithmetic Operators, Increment and Decrement Operators, Comparison Operators, Logical Operators, Operator Precedence; Control Flow Statements, If-else Statement, Switch Statement, For Loop, While Loop, Do... While Loop, Break Statement Continue Statement Arrays and Strings: Arrays; String Handling; Special String Operations; Character Extraction; String Comparison; Searching Strings; String Modification; String Buffer.	12
III	**Inheritance, Package and Interface:** Inheritance, Types of Relationships, What is Inheritance?, Significance of Generalization, Inheritance in Java, Access Specifiers, The Abstract Class; Packages, Defining a Package, CLASSPATH; Interface, Defining an Interface, Some Uses of Interfaces, Interfaces versus Abstract Classes Exception Handling: Definition of an Exception; Exception Classes; Common Exceptions; Exception Handling Techniques Streams in Java: Streams Basics; Abstract Streams; Stream Classes; Readers and Writers; Random Access Files; Serialization	12

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Session 2023 – 2024
B.Sc. III Year
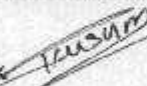### Programming in Java (theory) (Group-B Paper-I)

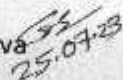|	Part B: Content Of the Course Programming in Java	
	Total No. of Lectures =60 (in hours per week) -0-0	
Unit	Topics	No. of Lectures
IV	**Applets:** What are Applets?; The Applet Class; The Applet and HTML; Life Cycle of an Applet; The Graphics Class; Painting the Applet; User Interfaces for Applet; Adding Components to user interface; AWT (Abstract Windowing Toolkit) Controls Event Handling: Components of an Event; Event Classes; Event Listener; Event-Handling; Adapter Classes; Inner Classes; Anonymous Classes Swing: Concepts of Swing; Java Foundation Class (JFC); Swing Packages and Classes; Working with Swing- An Example; Swing Components	12
V	**Java Data Base Connectivity:** Java Data Base Connectivity; Database Management; Mechanism for connecting to a back end database; Loading the ODBC driver RMI, CORBA and Java Beans: Remote Method Invocation (RMI); RMI Terminology; Common Object Request Broker Architecture (CORBA), What is Java IDL?, Example: The Hello Client-Server; Java Beans, The BeanBox, Running the BeanBox Networking in Java: Networking in Java; URL Objects Java Server Pages and Servlets: Java Server Pages (JSP), What is needed to write JSP based web application?, How does JSP look?, How to test a JSP?; Servlets, History of Web Application, Web Architecture, Servlet Life Cycle	12

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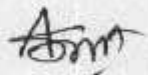
Dr. K. S. Bhatia   Dr. Kusumlata Rajak   Dr. Samar Upadhyay

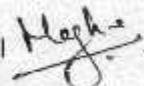Dr. Geeta Shrivastava 25.07.23   Dr. Binay Singh   Mr. Anurag Singh
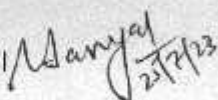
Dr. Vijay Khare   Dr. Meghna Utmal   Dr. S. K. Dubey
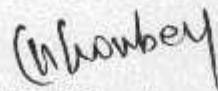
Dr. Sudipta Sanyal 25/7/23   Dr. S.S. Shrivastava   Ms. Aarti Chouksey 25/7/23

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Head of the Department

Govt. M. H. College of Home Science & Science for Women (Autonomous) Jabalpur(M.P.)
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Session 2023 – 2024
B.Sc. III Year
Programming in Java (theory) (Group-B Paper-I)

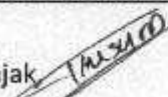|	Part C: Learning Resources Text Books, Reference Books, Other resources	
	Suggested Readings: • Advanced Java Programming by Uttam Roy (Oxford University Press) • Effective Java by Joshua Bloch (Addison Wesley) • Programming With Java by E Balagurusamy(McGraw-Hill) • Java- A Beginner's Guide Herbert Schildt (McGraw-Hill Education) • मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें। **Suggested Digital Platforms,Weblinks** • htt12s://www.learnjavaonline.org/ • https://www.javatpoint.com/java-tutorial • https://www.w3schools.com/java/ • https://www.tutorialspoint.com/java/index.htm	

PartB:Content Of the Course Programming in Java(Suggested Practicals)
Total No .of Lectures =30 lectures each of 2 hours duration (in hours per week):2-0-0

1. Write a Java program that takes a number as input and prints its multiplication table upto 10.
2. Write a Java program to print the area and perimeter of a circle.
3. Write a Java program to test Prime Number.
4. Write a Java program to convert a decimal number to binary number and vice versa.
5. Implement a Java function that calculates the sum of digits for a given character array consisting of the digits 'O' to '9'. The function should return the digit sum as a long value.
6. Write a Java program to find the smallest and largest element from the flrray.
7. Designed a class SortData that contains the method asec() and desc().
8. Designed a class that demonstrates the use of constructor and destructor.

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Programming in Java (theory) (Group-B Paper-I)

9. Write a java program to demonstrate the implementation of abstract class.
10. Write a Java program to implement sinQle level inheritance & multiple level inheritance.
11. Write a java program to implement method overriding
12. Create a package, Add the necessary classes and import the package in java class.
13. Write a java program to add or multiply two matrices and print the resultant matrix.
14. Write a java program to implement the vectors. 15. Write a java program to implement thread life cycle & multithreading
16. Design a AWT program to print the factorial for an input value.
17. Design an AWT program to perform various string operations like reverse string, string concatenation etc.
18. Write a program that would accept it input for the user & store it in a file called Test. Java
19. Write an applet that display a choice menu of three buttons (Add, Modify, Delete) selecting a choice from the menu should display the appropriate button Use the show () method of the layout Manager.
20. Write a program to implement the concept of loading & displaying images.

Part C: Learning Resources
Text Books, Reference Books, Other resource

Suggested Readings:

- Advanced Java Programming by Uttam Roy(Oxford University Press}
- Effective Java by Joshua Bloch (Addison Wesley)
- Programming With Java by E Balagurusamy (McGraw-Hill}
- Java- A Beginner's Guide Herbert Schildt (McGraw-Hill Education
- मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforns,Weblinks

- ht1ps://www.learnjavaonline.org/
    - https://www.javatpoint.com/java-tutorial
    - https://www.w3schools.com/java/
    - https://www.tutorialspoint.com/java/index.htm

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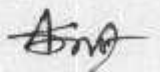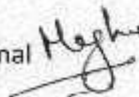Dr. K. S. Bhatia   Dr. Kusumlata Rajak   Dr. Samar Upadhyay

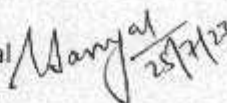Dr. Geeta Shrivastava   Dr. Binay Singh   Mr. Anurag Singh
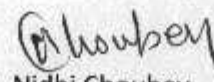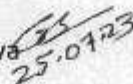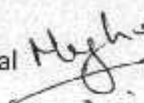
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Class	Subject	Year	Max. Marks	Min. Marks	Paper Title
B.sc.	Computer Application	III	30+70	35	Multimedia Tools and Applications (Theory) (Group-8 Paper-II)

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
I	**Text:** Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext. Images: Still Images - bitmaps, vector drawing, 30 drawing & rendering, Basic steps for image processing, Color Management System (CMS), natural light & colors, computerized colors, color palettes, image file formats.	12
III	**Digital Audio and Video:** Characteristics of sound and Digital audio, Digital Audio systems, MIDI, Audio file formats, Characteristics of digital video, Using Audio 111 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

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B.Sc. III Year
Multimedia Tools and Applications (Theory) (Group-B Paper-II)

Part C: Learning Resources
Text Books, Reference Books, Other resource

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.
4. John F. Koegel Buford, "Multimedia Systems", Addison Wesley, Pearson Education.
5. Multimedia System Design by Prabhat K. Anclleign, Kiran thakrar - prentice hall Publication.
6. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforms,Weblinks

1. https:LLonlinecourses.swaY:am2.ac.inLnou20 csOSLpreview
2. http:LLegY:ankosh.ac.inLbitstreamL123456789L12327LlLUnit-1 pdf
3. http:[Lwww.egY:ankosh.ac.inLbitstreamL123456789L52243L1L block-3.pdf
4. http:[Lwww.egY:ankosh.ac.inLbitstreamL123456789L69229L1L Unit-3.pdf
5. https:LLvikaspedia.inLeducationLdigita1-litercY:Lm u!timedia - and-animation

PartB:Content Of the Course
Programming in Java(Suggested Practicals)
Total No .of Lectures =30 lectures each of 2 hours duration (in hours per week):2-0-0
Practical Lab will be conducted based on the theory Syllabus

List of Practicals

Multimedia Tools and Applications Practicals:

1. Write a Program to include a paragraph in Web Page using HTML.
2. Write a Program of include image in Web Page using HTML.
3. Write a Program of including video in Web Page using HTML.
4. Create a web page for a clothing company which contains all the details of that company and atleast five links to other web pages.

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5. Write a program to show a bitmap image on your computer screen.
6. Write a program to play "wave" or "midi" format sound files.
7. Write a program to show animation of solar system.
8. Write a program to show animation of a ball moving in a helical path.
9. Design Banner using graphical processing tool.
10. Convert given image into different image formats.
11. Develop a webpage which shows animation with sound effects using any professional HTML editor.
12. Design wallpaper showing water drop effect in image.
13. Develop a webpage by Embedding video.
14. Develop GTF image using graphical processing tool.
15. Develop images using RGB/CMY/HSB color models.

Part C: Learning Resources
Text Books, Reference Books, Other resource

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. 4. John F. Koegel Buford, "Multimedia Systems", Addison Wesley, Pearson Education.
5. Multimedia System Design by Prabhat K. Andleign, Kiran thakrar - prentice hall Publication.
6. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforms, Web links

1. httQs:LLonlinecourses.swayam2.ac.inLnou20 cs0SLQreview
2. httQ:LLegyankosh.ac.inl'.bitstreamL1234567891'.12327Lll'.Unit-1.Qdf
3. httQ:LLwww.egyankosh.ac.inl'.bitstreaml'.123456789L52243L1Lb1ock-3.Qdf
4. httQ:LLwww.egyankosh.ac.inl'.bitstreaml'.1234567891'.69229L1LUnit-3.Qdf
5.httQs:LLvikasQedia.inl'.educationl'.digital-litercyl'.multimedia-and-animation

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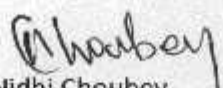Mr. Anurag Singh

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Department of Mathematics & Computer
Session 2023 – 2024
B.Sc. III Year
Internet and its Applications (Theory) (Minor)

Class	Subject	Year	Max. Marks	Min. Marks	Paper Title
B.sc.	Computer Application (Minor)	III	30+70	35	Internet and its Applications

Part- B: Content of the Course		
Internet and its Applications		
Total No. of Lectures =60 (in hours 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

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Dr. Sudipta Sanyal Dr. S.S. Shrivastava Ms. Aarti Chouksey

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B.Sc. III Year
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Unit	Topics	No. of Lectures (1 hour each)
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 editors 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, 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

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	Part C: Learning Resources
	Text Books, Reference Books, Other resources

Suggested Readings:

- Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition), PHI, 2010
- B. A. Forouzan, Data Communication and Networking, TMH,2003.
- D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, Springer
- HTML A Beginner's Guide, Tata McGraw-Hill Education, 2009.
- J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007
- मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें |

Suggested Digital Platforms, Weblinks

- https://www.javatpoint.com/internet
- https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_ science_ internet.htm
- https://www.tutorialspoint.com/html5/index.htm
- https://www.tutorialspoint.com/http/index.htm

	PartB: Content of the Course
	Internet and its Applications (Practicals)
	Total No. of Lectures = 30 lectures each of 2 hours duration (in hours per week):2-0-0

1. Understanding by demonstrating various Guided Media; Twisted pair, Coaxial cable, Optical fiber.
2. Understanding by demonstrating Network Devices such as NIC, repeaters, hub, bridge, switch, gateway and outer.
3. Understanding and demonstrating various LAN Topologies.
4. Understanding of basic trouble shooting related to Internet connectivity.
5. Hands on working with internet and its applications (understanding of Web Browsing Softwares and email)
6. Understanding of various security features while working on Internet.
7. Create HTML document with following formatting - Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
8. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
9. Learn to use UNIX on Windows.
10. Write a program to print "Hello PHP" using variable.

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- B. A. Forouzan, Data Communication and Networking, TMH,2003.
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- J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007
- मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Suggested Digital Platforms, Weblinks

- https://www.javatpoint.com/internet
- https://www.tutorialspoint.com/basics_of_computer_science/basics_of_c computer_science_internet.htm
- https://www.tutorialspoint.com/html5/index.htm
- https://www.tutorialspoint.com/http/index.htm

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