GAYATRI VIDYA PARISHAD

College for Degree and PG Courses (Autonomous)

(Affiliated to Andhra University)

Visakhapatnam

Department of Computer Applications

BACHELOR OF COMPUTER APPLICATIONS

Syllabus

With effect from 2020-21 admitted batch

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)

Department of Computer Applications

BACHELOR OF COMPUTER APPLICATIONS Under CBCS

Course Structure and Scheme of Examination w.e.f 2020-21

I Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA1.1.1	First Language-English-I	4	75	25	100	3
BCA1.1.2	Second Language-Hindi/Sanskrit-I	4	75	25	100	3
BCA1.1.3	Life Skill Course – I (Human Values & Professional Ethics)	2	50	0	50	2
BCA1.1.4	Skill Development Course – I (Plant Nursery)	2	50	0	50	2
BCA1.1.5	Computer Fundamentals & MS office	4	75	25	100	4
BCA1.1.6	Computer Fundamentals & MS office Lab	2	50	0	50	1
BCA1.1.7	Programming Using “C”	4	75	25	100	4
BCA1.1.8	Programming Using “C” Lab	2	50	0	50	1
BCA1.1.9	Numerical and Statistical Methods	4	75	25	100	4
BCA1.1.10	Numerical and Statistical Methods Lab	2	50	0	50	1
Total		**30**	**625**	**125**	**750**	**25**

II Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA1.2.1	First Language-English-II	4	75	25	100	3
BCA1.2.2	Second Language-Hindi/Sanskrit-II	4	75	25	100	3
BCA1.2.3	Life Skill Course – II - Personality Enhancement and Leader Ship	2	50	0	50	2
BCA1.2.4	Life Skill Course – III - Analytical Skills	2	50	0	50	2
BCA1.2.5	Skill Development Course – II - Solar Energy	2	50	0	50	2
BCA1.2.6	Skill Development Course – III – Food Adulteration	2	50	0	50	2
BCA1.2.7	Data Structures	4	75	25	100	4
BCA1.2.8	Data Structures Lab	2	50	0	50	1
BCA1.2.9	Database Management Systems	4	75	25	100	4
BCA1.2.10	Database Management Systems Lab	2	50	0	50	1
BCA1.2.11	Accounting and Financial Management	4	75	25	100	4
BCA1.2.12	Accounting and Financial Management Lab	2	50	0	50	1
Total		**34**	**725**	**125**	**850**	**29**

III Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA2.1.1	First Language-English-III	4	75	25	100	3
BCA2.1.2	Second Language-Hindi/Sanskrit -III	4	75	25	100	3
BCA2.1.3	Life Skill Course – IV - E.E	2	50	0	50	2
BCA2.1.4	Skill Development Course – IV - Di.Mgt	2	50	0	50	2
BCA2.1.5	Object Oriented Programming Through Java	4	75	25	100	4
BCA2.1.6	Object Oriented Programming Through Java Lab	2	50	0	50	1
BCA2.1.7	Operating Systems	4	75	25	100	4
BCA2.1.8	Operating Systems Lab	2	50	0	50	1
BCA2.1.9	Statistical Methods & their Applications	4	75	25	100	4
BCA2.1.10	Statistical Methods & their Applications Lab	2	50	0	50	1
Total		**30**	**625**	**125**	**750**	**25**

IV Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA2.2.1	Cryptography	4	75	25	100	4
BCA2.2.2	Cryptography Lab	2	50	0	50	1
BCA2.2.3	Data Mining & Data Ware Housing	4	75	25	100	4
BCA2.2.4	Data Mining & Data Ware Housing Lab	2	50	0	50	1
BCA2.2.5	Web Programming	4	75	25	100	4
BCA2.2.6	Web Programming Lab	2	50	0	50	1
BCA2.2.7	Unix	4	75	25	100	4
BCA2.2.8	Unix Lab	2	50	0	50	1
BCA2.2.9	Data Analytics using R	4	75	25	100	4
BCA2.2.10	Data Analytics using R Lab	2	50	0	50	1
BCA2.2.11	Object Oriented Software Engineering	4	75	25	100	4
BCA2.2.12	Object Oriented Software Engineering Lab	2	50	0	50	1
Total		**36**	**750**	**150**	**900**	**30**

V Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits

BCA3.1.1	Networks	4	75	25	100	4
BCA3.1.2	Networks Lab	2	50	0	50	1
BCA3.1.3	Android Programming	4	75	25	100	4
BCA3.1.4	Android Programming Lab	2	50	0	50	1
BCA3.1.5	Artificial Intelligence	4	75	25	100	4
BCA3.1.6	Artificial Intelligence Lab	2	50	0	50	1
BCA3.1.7	**Elective-I [Theory]:** Python PHP	4	75	25	100	4
BCA3.1.8	**Elective-I [Lab]:** Python Lab PHP Lab	2	50	0	50	1
BCA3.1.9	**Elective-II [Theory]:** Principles and Techniques of Animation Computer Graphics	4	75	25	100	4
BCA3.1.10	**Elective-II [Lab]:** Principles and Techniques of Animation Lab Computer Graphics Lab	2	50	0	50	1
BCA3.1.11	**Elective-III [Theory]:** Cloud Computing Mobile Computing	4	75	25	100	4
BCA3.1.12	**Elective-III [Lab]:** Cloud Computing Lab Mobile Computing Lab	2	50	0	50	1
Total		**36**	**750**	**150**	**900**	**30**

VI Semester

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA3.2.1	FIRST and SECOND PHASES (2 spells) of APPRENTICESHIP between 1st and 2nd year and between 2nd and 3rd year (two summer vacations).				APPRENTICESHIP between 1st and 2nd year (1Spell)	4
BCA3.2.2	THIRD PHASE of APPRENTICESHIP Entire 5th / 6th Semester				APPRENTICESHIP between 2nd and 3rd year (2Spell)	4
BCA3.2.3	**Main Project**					12
Total		**--**	**--**	**--**	**--**	**20**
Grand Total		**166**	**3475**	**675**	**4150**	**159**

BACHELOR OF COMPUTER APPLICATIONS

Syllabus

With effect from 2020-21 admitted batch

Chairman

Board of Studies

(2020-21)

Department of Computer Applications
Gayatri Vidya Parishad College for Degree and PG Courses (A)
(Affiliated to Andhra University)
Visakhapatnam

BACHELOR OF COMPUTER APPLICATIONS

Syllabi

With effect from 2020-21 admitted batch

I YEAR I SEMESTER

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA1.1.1	First Language-English-I	4	75	25	100	3
BCA1.1.2	Second Language-Hindi/Sanskrit-I	4	75	25	100	3
BCA1.1.3	Life Skill Course – I (Human Values & Professional Ethics)	2	50	0	50	2
BCA1.1.4	Skill Development Course – I (Plant Nursery)	2	50	0	50	2
BCA1.1.5	Computer Fundamentals & MS office	4	75	25	100	4
BCA1.1.6	Computer Fundamentals & MS office Lab	2	50	0	50	1
BCA1.1.7	Programming Using “C”	4	75	25	100	4
BCA1.1.8	Programming Using “C” Lab	2	50	0	50	1
BCA1.1.9	Numerical and Statistical Methods	4	75	25	100	4
BCA1.1.10	Numerical and Statistical Methods Lab	2	50	0	50	1
Total		**30**	**625**	**125**	**750**	**25**

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester I

COMPUTER FUNDAMENTALS AND MS OFFICE

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To introduce the concepts of computer fundamentals and their applications for the efficient use of office technology in a business environment.
2. To introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software.
3. To provide hands-on use of Word, Excel and PowerPoint.

SYLLABUS

UNIT I:

Introduction to computers: Definition of computer, Characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations, Input devices and output devices: Keyboard and mouse, inputting data in other ways

UNIT II:

Memories: primary, secondary and cache memory, **Types of Software:** system software, Application software, commercial software, open-source software, domain software and free ware software, **Programming Languages**: Introduction to Programming Languages – Generations of Programming Languages

UNIT III:

MS-Word: Features of MS-Word, MS-Word Window components, creating, saving and opening documents, **Formatting documents:** Selecting text, formatting characters, changing cases, Paragraph formatting, Bullets & numbering, **editing text:** Copying & moving data, Finding & replacing text, Reversing actions (undo). Header & footer, **Working with Tables:** Definition, inserting tables, inserting & deleting rows and columns. **Working with Graphics:** Inserting pictures, inserting shapes, inserting clipart images. Mail merging, Printing documents.

UNIT IV:

MS-Excel: Excel Features, MS-Excel window components, Worksheets, rows, columns, cells. **Worksheet basics:** Workbooks, Creating a new workbook, Opening a Workbook, Saving a Workbook, Entering labels, values, and formulas in worksheet, Inserting rows and columns, Deleting rows and columns, **Formatting Options:** Adjusting row height and column width - Formatting cell values, **Formulas:** operators used in formula, cell references in formula, **Functions:** Definition, Inserting a function in Excel, Types of functions in Excel: Mathematical, Statistical, Logical, Text, **Working with Charts:** Different types of charts, Creating a chart, Parts of chart

UNIT V:		
Microsoft PowerPoint: PowerPoint features, MS-PowerPoint window components, creating a presentation, saving presentation and opening presentation, **working with slides:** Inserting, deleting, copying slides, editing text, formatting text, **Formatting and Modifying Presentations**: Applying transition and animation to the slides, inserting music or sound on a slide, viewing slide show		
Outcomes:		
1 Describe the usage of computers and why computers are essential components in business and society. 2. Identify categories of programs, system software and applications. Organize and work with files and folders. 3. Compose, format and edit a word document and working with macros. 4. Create work sheets and using various functions. 5. Make presentations and inserting multimedia in them.		
References:		
1. Rajaraman, Introduction to Information Technology, PHI 2. Introduction to Computers – Peter Norton Mcgraw Hill. 3. Microsoft Excel 2007, Custom Guide Inc, 2007		
Text Books:		
1. Computer Fundamentals – Pradeep. K.Sinha: BPB Publications. 2. Fundamentals of Computers by Reema Thareja from Oxford University Press 3. Microsoft Office 2007 Fundamentals, 1st Edition By Laura Story, Dawna Walls		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications
B.C.A-Semester I
COMPUTER FUNDAMENTALS AND MS OFFICE LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To Create a document in Microsoft Word with formatting
2. To Write functions in Microsoft Excel to perform basic calculations and to convert number to text and text to number
3. To create a presentation in Microsoft PowerPoint that is interactive and legible content.

SYLLABUS

MS-WORD

1. Prepare a document in to design a visiting card
2. Prepare a document to design front page of a text book
3. Prepare a document to illustrate headers and footers
4. Prepare a Call Letter for All Applicants to inform interview Details using mail merge

MS-EXCEL

5. Create an excel sheet to show time table of your class
6. Create a pay slip with details of employee salary
7. Create an excel sheet for student result and grades calculation
8. Prepare an excel sheet for creating a pie chart for budget analysis
9. Prepare an excel sheet to illustrate various functions

MS-POWERPOINT

10. Prepare a presentation about your college
11. Prepare a presentation about Olympic games
12. Prepare a presentation about your country / state / place

Outcomes:

1. Student will get knowledge the basic technicalities of creating Word documents for office use.
2. Student will get knowledge Create and design a spreadsheet for general office
3. Student will get knowledge the basic technicalities of creating a PowerPoint presentation.
4. Student will get knowledge the practices in data & files management
5. Student will create formulas in excel sheet.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications
B.C.A-Semester I
PROGRAMMING USING C

Credits: 4	**Theory: 4 Hours**	**Tutorials: -**
Max Marks: 100	**External: 75 Marks**	**Internal: 25 Marks**

Course Objectives:

1. Provides knowledge on Algorithms, Flow chart and different programming languages.
2. To train the students with basic concepts of programming using C.
3. Provides complete knowledge of C language.
4. Helps to develop logics which will help them to create program and applications in C.
5. Learning the basic programming constructs, they can easily switch over to any other language in future.

SYLLABUS

UNIT I:

Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages

Introduction to C: Introduction – Structure of C Program – Writing the first C Program – Files used in C Program – Compiling and Executing C Programs - Programming Example

UNIT II:

C Fundamentals: Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Operators in C – I/O Statements (scanf, printf)

Decision Control Statements: Introduction to Decision Control Statements – Conditional Branching Statements: simple if, if..else, nested if, switch statements – Programming Examples

UNIT III:

Iterative Control Statements: Iterative Statements – Nested Loops – Break and Continue Statement - Goto Statement

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – one dimensional array for inter-function communication – Two dimensional Arrays – two dimensional arrays for inter-function communication

Strings: Introduction – String operations – String functions

UNIT IV:

Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

Structure and Unions: Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Unions – Arrays of Unions Variables

UNIT V:

Pointers: Introduction to Pointers – declaring Pointer Variables – Passing Arguments to Functions using Pointer – Pointer and Arrays – Dynamic Memory Allocation

File Handling: Introduction to Files, File modes, File operations, Reading Data from Files, Writing Data from Files, Detecting the End-of-file

Outcomes:

Upon successful completion of this course, students will be able to-

1. Understand the basic terminology used in computer programming.
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Understand the dynamics of memory by the use of pointers and Structures.
6. Apply different operations in File handling.

References:

1. E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Yashavant Kanetkar - Let Us 'C' – BPB Publications.
4. Brain W Kernighan and Dennis M Ritchie - The 'C' Programming language - Pearson publications.

Text Books:

Computer Fundamentals and Programming in C by Reema Thareja from Oxford University Press

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester I

PROGRAMMING USING C LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To implement decision making and arrays.
2. To develop programs for pointers and structures.
3. To write C programs using Files.

SYLLABUS

1. Write a C program to calculate the expression: ((a*b)/c)+(a+b-c) .
2. Write a C program to calculate $(a+b+c)^3$.
3. Write a C program to check whether the given number is Prime or Not.
4. Write a C program to find the sum of individual digits of a given number .
5. Program to convert Hours into seconds.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a program to check whether given number is Palindrome or Not.
8. Write a C program to check whether a given 3-digit number is Armstrong number or not.
9. Write a C program to print the numbers in triangular form.

```
1

1 2

1 2 3

1 2 3 4
```

10. Program to display number of days in given month using Switch – Case.
11. Write a C program to perform the following:
    i. Addition of two matrices.
    ii. Multiplication of two matrices.
12. Write a C program to determine if the given string is a palindrome or not.
13. Write C program to find the factorial of a given integer using recursive function.
14. Write a C program to concatenate two strings using pointers.
15. Write a C program to find the length of string using pointers.
16. Program to display Student Details using Structures.
17. Write a C program to
    iii. Write data into a File.
    iv. Read data from a File.

Outcomes:

After Completion of the course student should able to

1. Student will be able to Know concepts in problem solving.
2. Ability to do programming in C language.
3.To write diversified solutions using C language.
4. ability to write programming with pointers and structures.
5. Ability to write c programming with files.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester I

NUMERICAL AND STATISTICAL METHODS

Credits: 4	Theory: 4 HOURS	TUTORIALS: -
Max Marks: 100	External: 75 Marks	Internal: 25

Course Objectives:

1. To learn how to perform error analysis for arithmetic operations.
2. To demonstrate working of various numerical methods and matrix methods
3. To provide a basic understanding of the derivation and use of methods of interpolation and numerical integration.
4. To impart knowledge of various statistical techniques.
5. To develop students understanding through laboratory activities to solve problems related to above stated concepts.

	SYLLABUS	
Unit I:		

Numerical Integration, Finite Difference and Interpolation

Numerical Integration:

1. Trapezoidal rule 2. Simpson's 1/3 rule 3. Simpson's 3/8 rule

Finite Difference and Interpolation:

Finite Differences - Forward Differences - Backward differences.

Newton's forward interpolation formula - Newton's backward interpolation formula

Unit II:		

Matrix Algebra

Matrix Algebra: Types of matrices -Matrix addition and subtraction - Matrix Multiplication- Transpose of a matrix, row matrix, column matrix, Symmetric and skew symmetric matrices.

Unit III:		

Linear Equations

Ad joint of a square matrix- Inverse of square matrix by using Adj A 3 order only and Rank of a Matrix.

Solution of Linear Equations

Cramer's Rule

Matrix Inverse method

Statistical Methods

Unit IV:		

Basic concepts and definition of statistics: measures of central tendency, Mean, Median and Mode, Standard deviation, coefficient of variation Skewness, Karl pearson's coefficient of skewness, Bowley's Coefficient of skewness,

Unit V:		

Correlation: Karl Pearson correlation coefficient, Rank correlation and illustrated examples.

Probability: Basic concepts and definition of probability, probability axioms, conditional probability, addition and multiplication theorem of probability (Based on set theory concepts), Only Statements, Problems and applications.

Note: 1. Concentration on numerical problems only.

2. Proofs of theorems and Derivations of expressions are omitted.

Outcomes:		
1. Skill to choose and apply appropriate numerical methods to obtain appropriate solutions to difficult mathematical problems. 2. Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion. 3. Skill to execute programs of various Numerical Methods and Statistical techniques for solving mathematical problems. 4. Ability to find the solution of algebraic and transcendental equations. 5. Familiarize with Newton's backward and forward interpolation formulae.		
Text Books:		
1. Mathematical Methods by Dr.T.K.V. Iyengar, Dr.B.Krishna Gandhi, Dr. S.Ranganatham, and Dr.M.V.S.S.N. Prasad by S.Chand publications 6th revised edition 2011. 2. Quantitative Techniques by C.Satyadevi by S.Chand Company		
References:		
1. Higher Engineering Mathematics by Dr.B.S.Grewal by Karna publisher‟s 34th edition. 2. Statistical Methods – Snedecor G.W. & Cochran W.G. Oxford & + DII. 3. Elements of Statistics – Mode. E.B. - Prentice Hall. 4. Statistical Methods – Dr. S.P. Gupta – Chand & Sons.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester I

NUMERICAL AND STATISTICAL METHODS LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. This lab course will provide opportunity to the learners to implement the concepts and techniques learned in Numerical and Statistical Techniques course in C/C++ Language and/or in MS-Excel

SYLLABUS

1. Problem on Trapezoidal rule.
2. Problem on Simpsons 1/3rd rule.
3. Problem on Simpsons 3/8rd rule.
4. Forward and backward difference Tables.
5. Problem on Newton's forwards interpolation formula.
6. Problem on Newton's backward interpolation formula.
7. Problem on Matrix addition, Subtraction and multiplications.
8. Problems on Symmetric and Skew Symmetric Matrices.
9. To find adjoint of a square Matrices.
10. To find Inverse of a Square Matrices.
11. Solution of linear equations by Cramer and Inverse Methods.
12. To find Mean, Median and Mode for grouped data.
13. To find Standard deviation.
14. To find correlation.
15. To find rank correlation.

Outcomes:

After Completion of the course student should able to

1. Student will be able to Know concepts in problem solving.
2. Ability to do programming in C language.
3. To write diversified solutions using C language.
4. ability to write programming with pointers and structures.
5. Ability to write c programming with files.

BACHELOR OF COMPUTER APPLICATIONS

Syllabi

With effect from 2020-21 admitted batch

I YEAR II SEMESTER

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA1.2.1	First Language-English-II	4	75	25	100	3
BCA1.2.2	Second Language-Hindi/Sanskrit-II	4	75	25	100	3
BCA1.2.3	Life Skill Course – II	2	50	0	50	2
BCA1.2.4	Life Skill Course – III	2	50	0	50	2
BCA1.2.5	Skill Development Course – II	2	50	0	50	2
BCA1.2.6	Skill Development Course – III	2	50	0	50	2
BCA1.2.7	Data Structures	4	75	25	100	4
BCA1.2.8	Data Structures Lab	2	50	0	50	1
BCA1.2.9	Database Management Systems	4	75	25	100	4
BCA1.2.10	Database Management Systems Lab	2	50	0	50	1
BCA1.2.11	Accounting and Financial Management	4	75	25	100	4
BCA1.2.12	Accounting and Financial Management Lab	2	50	0	50	1
Total		**34**	**725**	**125**	**850**	**29**

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications
B.C.A-Semester II
DATA STRUCTURES

Credits: 4	**Theory: 4 Hours**	**Tutorials: -**
Max Marks: 100	**External: 75 Marks**	**Internal: 25 Marks**

Course Objectives:

1. The objective of the course is to make a student to implement data structures and organize data based on data structures for efficient access.		
	SYLLABUS	
UNIT I:		
Introduction to Data Structure: Definition, Data Types, Abstract Data Types (ADT), classification of data structure - primitive & non-primitive data structures, Linear and Non-linear data structures **Arrays:** Definition, one dimensional array, two dimensional arrays, Applications, pointers. **Linked List:** Definition, linked list ADT, single linked list, double linked list, circular linked list, comparison of linked list with Arrays.		
UNIT II:		
STACKS: Definition, Stack as an ADT & Operations on stack, Applications of stack, Representation of stack. **QUEUES:** Definition, Queue as an ADT & Operations on Queue, Application of Queues, Representation of Queues, Various Queue Structures: circular Queue, DE Queue.		
UNIT III:		
TREES: Definition, Basic Tree Terminology. **Binary Tree** – Definition, Properties of Binary Trees, Types of Binary Trees, Representation of Binary Tree, Binary Tree Traversals. **Binary Search Tree (BST)** – Definition, Operations on a Binary Search Tree, Examples of BST.		
UNIT IV:		
GRAPHS: Definition, Basic Graph Terminology, Representation of Graphs, Graph Traversal – DFS and BFS. Topological sort, Shortest Path problem, Minimum Spanning Tree.		
UNIT V:		
SORTING: Definition, Sorting methods - Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, and Merge Sort.**SEARCHING**: Definition, searching methods - Linear or Sequential Search, Binary Search.		
Outcomes:		
1. Identify data structures suitable to solve problems. 2. Developing algorithms. 3. Identifying the use of Time and Space Complexity. 4. Implementing different sorting & searching techniques.		
References:		
1. Data structures by Lipschutz, McGraw Hill Education 2. Fundamentals of Data Structures in C by Sahni Horowitz, University Press 3. Data Structures and Algorithms by Alfred V Aho and John E Hopcroft and Jeffrey D Ullman, Pearson Education 4. **"Data Structures through C", Yashavant Kanetkar, BPB Publications**		
Text Books:		
1. "Classic Data Structures", by Debasis samantha 2nd edition, phi publications, 2009 2. "Data structures and algorithms", by Narasimha karumanchi , careermonk publications , 2017		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester II

DATA STRUCTURES LAB

Credits: 1	**Lab: 2 Hours**	**Tutorials: -**
Max Marks: 50	**External: 50 Marks**	**Internal:**

Course Objectives: The course is designed to develop skills to design and analyze and

implement simple linear and non - linear data structures in java. It strengthens the ability to the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

	SYLLABUS	

1. Program to generate Fibonacci series using recursion
2. Program for implementation of stack using arrays.
3. Program for implementation stack using linked list.
4. Program for implementation queue using array.
5. Program for implementation queue using linked list.
6. Program for implementation of circular queue.
7. Program for linear searching.
8. Program for binary searching.
9. Program for Binary search tree operations.
10. Program to implement Graph traversal using DFS
11. Program to implement Graph traversal using BFS
12. Program for bubble sort
13. Program for selection sort
14. Program for insertion quick sort
15. Program for merge sort

Outcomes:		

After completion of course, student will be able to:

1. Implement linked list data structure.
2. Implement various sorting algorithms.
3. Implement various data structure such as stacks, queues, trees, graphs using java-programming language.
4. Implement tree and graph traversals.
5. implement graph traversal algorithms.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester II

DATA BASE MANAGEMENT SYSTEM

Credits: 4	**Theory: 4 Hours**	**Tutorials: -**
Max Marks: 100	**External: 75 Marks**	**Internal: 25 Marks**

Course Objectives:

1. The objective of the course is to introduce the design and development of databases for data science with analytical features in relational databases.

	SYLLABUS	
UNIT I:		

Introduction to Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, Classification of Database Management Systems, advantages and disadvantages of database approach, services of database systems, Components of Database Management System

UNIT II:		

The Relational Database Model: Various Data Models, Relational Database model, Keys used in Relational model, Relational Data Integrity, Relational set operators, Relationships within the Relational Database, Codd's relational database rules.

Entity–Relationship Model: Introduction, The components of an ER model, entities, attributes, relationships, Classification of Entity Sets, Attribute Classification, Relationship Degree, Relationship Classification

UNIT III:		

Introduction to SQL: Structured Query Language (SQL) – Introduction - SQL data types - SQL literals , SQL operators: Arithmetic Operators - Comparison Operators - Logical Operators - Set Operators - Operator Precedence
Types of SQL commands: DDL, DML, TCL, DCL
Tables: Creating tables – Altering tables – dropping tables – displaying structure of table. Inserting, updating, and deleting: INSERT statement – Bulk inserts of data – UPDATE statement – DELETE statement

UNIT IV:		

Queries and Subqueries : **using SELECT statement**
Aggregate Functions **– Introduction – COUNT( ), COUNT(*), SUM( ), AVG( ), MAX( ) and MIN( ) functions.** Multiple table processing: **Joins and Unions**TCL commands: **COMMIT, ROLLBACK, and SAVEPOINT statements**
DCL commands: **Privileges and roles – Granting and Revoking privileges and roles GRANT and REVOKE statements.**

UNIT V:		

PL/SQL: Introduction, Structure of PL/SQL program, PL/SQL Data Types, operators used in PL/SQL, variables, declaring variables in PL/SQL, Creating and running a PL/SQL Program, **Control Structures:** Conditional control statements, Iterative Control statements, **Cursors:** Types of cursors, Steps to create a Cursor, using cursors in PL/SQL program

Outcomes:		

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

1. Gain knowledge of Database, DBMS and SQL.
2. Learn SQL as best analysis tool for extract data in different ways
3. Create a small database using SQL.
4. Able to construct SQL queries to Store, Retrieve data in database
5. Model database using ER Diagrams and design database schemas based on the model.

References:		

1. Elimasri / Navathe, Fundamentals of Database Systems, Fifth Edition, Pearson Addison Wesley (2007).
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER.
3. SQL: The Ultimate Beginners Guide by Steve Tale.
4. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
5. Database Management Systems by Raghu Ramakrishnan, McGrawhill

Text Books:

1. Database management Systems, Alexis Leon and Mathews Leon, Vikas Publications 2002
2. Peter Rob, Carlos Coronel, Database Systems Design, Implementation and Management, Seventh Edition, Thomson (2007)
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB publications

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester II

DATA BASE MANAGEMENT SYSTEM LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives: The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers.

SYLLABUS

1. Illustrate the creation of a table with constraints
2. Creation of college database and establish relationships between tables
3. Employee database

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

   Dept (deptno, dname, loc)

   Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)

   Generate the following queries using data of above tables.

   i. List out all employees details
   ii. Display empno, ename, job and sal columns of all employees
   iii. Display employee details who are working as 'CLERK'
   iv. Find out number of employees working in each department
   v. Find out job wise total salaries and number of employees.
   vi. Calculate HRA as 30% and DA as 65% of salary
4. Demonstrate the use of GRANT and REVOKE commands to provide authorization

PL/SQL PROGRAMS

5. Write a PL/SQL program to check the given number is armstrong or not.
6. Write a PL/SQL program to check the given string is palindrome or not.
7. Writ a PL/SQL program to generate multiplication tables
8. Write a PL/SQL code to find the factorial of any number.
9. Write a PL/SQL program to check the given number is palindrome or not.
10. Write a PL/SQL program to display to 10 rows in Emp table based on their job and salary.
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%.

Outcomes:

1. Able to apply the basic commands of SQL – DDL, DML.
2. Able to create the tables at different levels.
3. Able to create different databases with primary key, foreign keys and insert values for DDL and DML operations.
4. Able to solve the queries using PL/SQL.

Able to write procedures.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications
B.C.A-Semester II
ACCOUNTING AND FINANCIAL MANAGEMENT

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. This paper is designed to impart knowledge regarding concepts of Accounting and financial management. This course is useful for Students to get placements in different offices as well as companies in Accounts departments.

	SYLLABUS	
UNIT I:		

Fundamentals of Management

Definition – Nature & scope of Management – Characteristics of Management – Functions of Management – Henry Fayol Principles of Management – Effective Manager – Introduction to Financial Management – Definition - Need of financial management - characteristics of financial management

UNIT II:		

Introduction to Accounting

Need for Accounting – Definition – Objectives, Advantages – Book keeping and Accounting – Accounting concepts and conventions – Accounting Cycle – Classification of Accounts and its rules – Double Entry Book-keeping – Journalization – Posting to Ledgers, Balancing of ledger Accounts (problems).

UNIT III:		

Subsidiary Books

Types of Subsidiary Books – purchases Book- Purchase returns Book-Sales Book – Sales returns Book – Cash Book – Simple Cash Book – Two Columnar Cash Book – Three-column Cash Book – Petty cash Book (Problems).

UNIT IV:		

Bank Reconciliation Statement

Need for bank reconciliation - Reasons for difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement- Problems on both favorable and unfavorable balances.

UNIT V:		

Trail Balance and Final Accounts

Meaning objectives - Methods of preparation of trial balance –Total's method –Balances Method Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – with adjustments- Bad debts- Provision for bad debts (Simple Problems).

Outcomes:		

1. Company Setup & Configurations.
2. Recording Financial Transactions.
3. Financial Reports

Text Books:		
1. T.S.Reddy & A. Murthy, Financial Accounting , Margham Publications 2. Organization and Management - by R.G. Agarwal TATA Mc Grawhill Pub. Ltd., 3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers		
References:		
1.V.K. Goyal, Financial Accounting, Excel Books 2.K. Arunjothi, Fundamentals of Accounting; Maruthi Publications 3.Tulasian, Accountancy -I, Tata McGraw Hill Co.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester II

ACCOUNTING AND FINANCIAL MANAGEMENT LAB

Credits: 1	**Lab: 2 Hours**	**Tutorials: -**
Max Marks: 50	**External: 50 Marks**	**Internal:**

Course Objectives: The objective is to teach the basic application of **Tally** to ensure students have exposure and hands on experience that enables to use the **Tally** effectively & efficiently preparing them to bridge the gap between the industry interfaces with academics.

SYLLABUS

1. Preparation of ledger and cash book
2. Practice and functioning of triple column cash book
3. Creation of journal voucher
4. Creation of payment voucher
5. Preparation of Bank reconciliation statements
6. Create company using accounts
7. Displaying trial balance
8. Displaying financial statements

Outcomes:

1. Ability to explain how to use a Tally s/w and its advantages.
2. Will be able to create a company in Tally s/w.
2. Ability to prepare profit and loss accounts using Tally s/w.
3. Ability to prepare balance sheets for a given set of transactions.
4. Ability to create a Ledger accounts in Tally.

BACHELOR OF COMPUTER APPLICATIONS

Syllabi

With effect from 2020-21 admitted batch

II YEAR I SEMESTER

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA2.1.1	First Language-English-III	4	75	25	100	3
BCA2.1.2	Second Language-Hindi/Sanskrit -III	4	75	25	100	3
BCA2.1.4	Life Skill Course – IV	2	50	0	50	2
BCA2.1.5	Skill Development Course – IV	2	50	0	50	2
BCA2.1.6	Object Oriented Programming Through Java	4	75	25	100	4
BCA2.1.7	Object Oriented Programming Through Java Lab	2	50	0	50	1
BCA2.1.8	Operating Systems	4	75	25	100	4
BCA2.1.9	Operating Systems Lab	2	50	0	50	1
BCA2.1.10	Statistical Methods & their Applications	4	75	25	100	4
BCA2.1.11	Statistical Methods & their Applications Lab	2	50	0	50	1
Total		**32**	**675**	**125**	**800**	**25**

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications
B.C.A-Semester III
OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

	SYLLABUS	
UNIT I:		

Fundamentals of OOP: Introduction, Object Oriented paradigm, Basic Concepts of OOP **Overview of Java Language**: Introduction, Java features, Java program structure, Java tokens, Implementing a Java Program, Java Virtual Machine (JVM), Command line arguments. **Constants, Variables & Data Types:** Introduction, Constants, Data Types, Variables, Declaration of Variables, Giving Value to Variables, Scope of variables, Type casting, operators

UNIT II:		

Input and Output in Java: Reading Input with Java.util.Scanner Class, Displaying Output with System.out.println( ), **Control Statements in Java:** Conditional control statements, Iterative control statements, break Statement, continue Statement, return Statement, **Classes, Objects & Methods:** Introduction, Defining a class, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members

UNIT III:		

Arrays, Strings: Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Wrapper classes, **Inheritance**: Introduction, Types of inheritance, Overriding methods, Final variables and methods, Final classes, Abstract methods and classes

UNIT IV:		

Interfaces: Defining interfaces, Extending interfaces, Implementing interfaces, Accessing interface variables, Multiple Inheritance using interfaces, **Exceptions:** Types of errors: Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements

UNIT V:		

Multithreaded Programming: Introduction, Lifecycle of a Thread, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, **Applet Programming:** Definition, Local and remote applets, Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state, Building Applet code, **Packages:** Introduction, Java API Packages, Creating Packages, Accessing a Package

Outcomes:		

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

1. Understand the concept and underlying principles of Object-Oriented Programming
2. Understand how object-oriented concepts are incorporated into the Java programming language
3. Develop problem-solving and programming skills using OOP concept
4. Understand the benefits of a well-structured program
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
6. Develop efficient Java applets and applications using OOP concept

Text Books:

1. E.Balaguruswamy, Programming with JAVA, A primer 3e, TATA McGraw-Hill Company

References:

1. Programming in Java by Sachin Malhotra, OXFORD University Press
2. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao &Kogent Learning Solutions Inc.
3. John R. Hubbard, Programming with Java, Second Edition, Schaum‟s outline Series, TATA McGraw-Hill Company.
4. Deitel & Deitel. Java TM: How to Program, PHI (2007)
5. Java Programming: From Problem Analysis to Program Design- D.S Mallik
6. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester III

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To build software development skills using java programming for real world applications.
2. To implement object-oriented concepts of java.
3. To implement classical problems using java programming.

SYLLABUS

1. WAP to find whether a number is prime or not
2. WAP to demonstrate the factorial of a number.
3. WAP to display a number is even or odd
4. WAP to find a sub string in the given string.
5. WAP to arrange the given strings in Alphabetic Order.
6. WAP to search an element using arrays
7. WAP to implement Addition and multiplication of two Matrices.
8. WAP to demonstrate the use of Constructor.
9. WAP to demonstrate the use of overriding Method.
10. WAP for single Inheritance.
11. WAP for implementing Interface.
12. WAP on Multiple Inheritance.
13. WAP for to implement Thread
14. WAP to demonstrate Exception handling.
15. WAP to demonstrate Applet program.

Outcomes:

1. Student can write programs using concepts of OOP.
2. Able to write programs on method overloading and overriding techniques.
3. Able to implement programs by reusing the properties of existing classes.
4. Acquire knowledge on how to handle multiple requests and process them using multithreading.

Able to write client-side application development using applets.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester III

OPERATING SYSTEMS

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1 To know the basic Structure, Components and Organization of Operating System.
2 To learn the notation of a Process-a Program in Execution, Management, Scheduling and Classic Problems of Synchronization.
3 To gain knowledge in various Memory Management Techniques.
4 To understand Various File operations.

	SYLLABUS	
UNIT I:		

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, Evolution of Operating Systems (Simple Batch, Multi programmed, Distributed Systems, Real-Time Systems), Operating System services, System Calls, Types of System Calls

UNIT II:		

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Process Scheduling - Schedulers, Non-Preemptive (FCFS, SJF) and preemptive Scheduling algorithms (RR), **Threads**: Definition, uses of threads, types of threads

UNIT III:		

File System Interface – **Files**: Introduction to files, File types, basic operations on files, file attributes, File Access methods, File Sharing, Protection, File System Structure, **Directories**: Introduction to directories, Directory Structure, **Mass Storage Structure** - Overview of Mass Storage Structure, Disk Structure, Disk Attachment

UNIT IV:		

Deadlocks - System Model, Deadlock Characterization, **Methods for Handling Deadlocks**: Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT V:		

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging

Outcomes:		

The students will be able to:

1. Understand the main components and Structure of Operating System& their functions.
2. Analyze various ways of Process Management & CPU Scheduling Algorithms.
3. Evaluate various device and resources like Memory, Time and CPU Management techniques in distributed systems.
4. Apply different methods for Preventing Deadlocks in a Computer System.

Text Books:		
1. Operating system Concepts: Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley. 2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.		
References:		
1. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press 2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson. 3. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester III

OPERATING SYSTEMS LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To familiarize the students with the Architecture of UNIX Operating System.
2. To learn the mechanisms of CPU Scheduling and Deadlock Detection algorithms.
3. To learn mechanisms of Processes synchronization using semaphores.

SYLLABUS

1. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
2. Developing applications using Inter Process Communication (using shared memory)
3. Implement any two memory management schemes
4. Implement file allocation techniques (Linked)
5. Implement Deadlock prevention algorithm.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Round robin. Compute and print the average waiting time and average turnaround time.
7. Implement file allocation techniques (Indexed)
8. Implement file allocation techniques (Contiguous)
9. Developing applications using Inter Process Communication (pipes)
10. Developing applications using Inter Process Communication (message queues)
11. Implement Deadlock detection algorithm.
12. Implement Deadlock avoidance algorithm.

Outcomes:

1. Students are able to differentiate difference between MS-DOS, Windows and UNIX OS.
2. Students are able to write programming by using system calls (read, write, fclose, fork, perror, pipe, sysconf) using vi editor.
3. Learn the role of CPU Scheduling algorithms and memory management using page replacement algorithms.
4. Students are familiar with basic UNIX commands.
5. Be familiar with shell programming and shell commands.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)

Department of Computer Sciences

B.C.A-Semester III

STATISTICAL METHODS AND THEIR APPLICATIONS

Credits: 4	Theory: 6 Hours	Tutorials: -
Max Marks: 100	External: 100 Marks	Internal: 25

Course Objectives:

1. To understand the scope and limitations of statistical methods.
2. To understand the Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.
3. Apply the Measures of dispersion techniques to find deviations central tendency.
4. Find the differences between Karl Pearson's, Bowley's and Kelly's measures of skewness.
5. To understand the use of linear regression analysis to develop an empirical model of experimental data.

SYLLABUS

Unit I:

Introduction - scope and limitations of statistical methods - classification of data - Tabulation of data - Diagrammatic and graphical representation of data - Graphical determination of percentiles and quartiles.

Unit II:

Measures of location: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.

Unit III:

Measures of dispersion: range, Quartile deviation, mean deviation, standard deviation, combined standard deviation, co-efficient of variation.

Unit IV:

Measures of Skewness Karl Pearson's, Bowley's, Kelly's and co-efficient of skewness and kurtosis based on moments.

Unit V:

Correlation - Karl Pearson -spearman's rank correlation - concurrent deviation method.
Regression Analysis: Simple Regression Equations.

Outcomes:

1. Evaluate the probabilities and conditional probabilities.
2. Evaluate expectations and conditional expectations of random variables.
3. Approximate the distribution of sum of random variables using CLT.
4. Construct point estimators using the method of maximum likelihood.
5. Calculate the number of samples needed to construct confidence levels on the mean and variance of a normal distribution.

Reference Books:

1. Fundamental of mathematical Statistics - S.C.Gupta&V.K.Kapoor- Sultan Chand
2. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII
3. Elements of statistics - Mode. E.B. -Prentice Hall
4. Statistical Methods - Dr.S.PGupta - Sultan chand& sons.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester III

STATISTICAL METHODS AND THEIR APPLICATIONS LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

This lab course will provide opportunity to the learners to implement the concepts and techniques learned in Statistical Techniques course in C/C++ Language and/or in MS-Excel

SYLLABUS

Session 1 : Frequency distribution, central tendency and dispersion

Session 2,3,4 : Hypothesis testing, t distribution, chi square distribution, f distribution, normal distribution

Session 5 : Regression and correlation coefficient-univariate, multivariate

Session 6 : Anova test

Session 7 : Central charts

Session 8 : Time series

Session 9, 10 : Sampling for a problem domain and analyse –Case Study

Outcomes:

1. Skill to choose and apply appropriate statistical methods to obtain appropriate solutions to difficult mathematical problems.
2. Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion.
3. Skill to execute programs of various Statistical techniques for solving mathematical problems.
4. Familiarize with various types of charts.

BACHELOR OF COMPUTER APPLICATIONS

Syllabi

With effect from 2020-21 admitted batch

II YEAR II SEMESTER

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA2.2.1	Cryptography	4	75	25	100	4
BCA2.2.2	Cryptography Lab	2	50	0	50	1
BCA2.2.3	Data Mining & Data Ware Housing	4	75	25	100	4
BCA2.2.4	Data Mining & Data Ware Housing Lab	2	50	0	50	1
BCA2.2.5	Web Programming	4	75	25	100	4
BCA2.2.6	Web Programming Lab	2	50	0	50	1
BCA2.2.7	Unix	4	75	25	100	4
BCA2.2.8	Unix Lab	2	50	0	50	1
BCA2.2.9	Data Analytics using R	4	75	25	100	4
BCA2.2.10	Data Analytics using R Lab	2	50	0	50	1
BCA2.2.11	Object Oriented Software Engineering	4	75	25	100	4
BCA2.2.12	Object Oriented Software Engineering Lab	2	50	0	50	1
Total		**36**	**750**	**150**	**900**	**30**

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications.
B.C.A-Semester IV
CRYPTOGRAPHY

Credits: 4	**Theory: 4 Hours**	**Tutorials: -**
Max Marks: 100	**External: 75 Marks**	**Internal: 25 Marks**

Course Objectives:

1.Introduction of the importance of network security.
2.To discuss various classical encryption techniques.
3.To gain knowledge about various symmetric key cryptographic techniques.
4.To introduce various asymmetric key cryptographic techniques.
5.To get acquainted with hashing techniques and digital signatures.

SYLLABUS

Unit I:

Introduction to Cryptography:
Security Concepts, Security goals, Computer Security, Network Security, Internet Security, OSI Security Architecture, Attacks, Services, Mechanisms, what is Cryptography, Encryption and Decryption, Symmetric and Asymmetric key Cryptography, Types of Cryptanalysis attacks, Steganography.

Unit II:

Classical Encryption Techniques:
Substitution Ciphers: Monoalphabetic ciphers - Additive cipher, shift cipher, Caesar cipher, multiplicative cipher, Affine cipher, Monoalphabetic Substitution cipher. Polyalphabetic ciphers – Autokey cipher, Playfair cipher, Vigenere cipher, Hill cipher, onetime pad.**Transposition Ciphers**: Keyless transposition ciphers, Keyed transposition ciphers, Combination of the two approaches.

Unit III:

Symmetric Key Ciphers:
Stream Ciphers and Block Ciphers, S-Boxes, DES, Triple DES, The strength of DES, AES.

Unit IV:

Asymmetric Key Ciphers:
Principles of Public Key Cryptosystems, RSA Algorithm, Diffie Hellman Key Exchange, Rabin Cryptosystems, Introduction to ECC.

UNIT V:

Integrity, Authentication: Message Integrity, Message Authentication. **Hash Functions**: Introduction, SHA-1, Whirlpool. **Digital Signatures**: Definition, Process, Services, RSA Digital signature Scheme, Elgamal Digital Signature Scheme.

Outcomes:

1. Familiarize with security concepts and fundamentals of cryptography.
2. Learns about various classical encryption techniques.
3. Studies various symmetric key encryption techniques.
4. Understands various asymmetric key and authentication techniques.
5. Learns about various hashing techniques and digital signature schemes.

References:

1. Cryptography and network security: principles and practice By William Stallings, 7th Edition.
2. Cryptography and Network Security, Behrouz and A. Forouzan.
3. AtulKahate, Cryptography and Network Security, Tata-McGraw-Hill-2003.
4. Bruce Schneier – "Applied Cryptography", John Wiley & Sons Inc, 2001.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

CRYPTOGRAPHY LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. Introduction of the importance of cryptography.
2. To discuss various evidence techniques.
3. To gain knowledge on various symmetric and asymmetric key cryptographic techniques.
4. To get acquainted with hashing techniques and digital signatures.

SYLLABUS

1. Write a program to implement Caesar Cipher Algorithm.
2. Write a program to implement PlayFair Algorithm.
3. Write a program to implement Hill Cipher Algorithm.
4. Write a program to implement One time-pad
5. Write a program to implement RailFence –Row and Column Transformation Technique
6. Write a program to implement simple DES Algorithm.
7. Write a program to implement RSA Algorithm.
8. Write a program to implement AES Algorithm.
9. Write a program to implement Digital Signature.
10. Write a program to implement SHA-1 Algorithm.

Outcomes:

1. Familiarize with security concepts and fundamentals of cryptography.
2. Learns about various classical encryption techniques.
3. Studies various symmetric and asymmetric key cryptographic techniques.
4. Learns about various hashing techniques and digital signatures.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

DATA MINING AND DATA WARE HOUSING

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. Master data mining techniques in various applications like social, scientific and environmental context. Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

	SYLLABUS	
UNIT I:		

Introduction: What Motivated Data Mining? Why Is It Important?, So, What Is Data Mining? , Data Mining—On What Kind of Data?: Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Data Preprocessing: Why Preprocess the Data?, Descriptive Data Summarization: Measuring the Central Tendency, Measuring the Dispersion of Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

UNIT II:		

Data Warehouse and OLAP Technology: An Overview , What Is a Data Warehouse? , A Multidimensional Data Model, From Tables and Spreadsheets to Data Cubes, Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional databases, Examples for Defining Star, Snowflake and Fact Constellation Schemas, Data Warehouse Architecture: Steps for the Design and Construction of Data Warehouses,

UNIT III:		

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item set Mining Methods: The Apriori Algorithm: Finding Frequent Item sets Using Candidate Generation, Generating Association Rules from Frequent Item sets.

UNIT IV:		

Classification and Prediction: What Is Classification? What Is Prediction? , Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Decision Tree Induction, Attribute Selection Measures. Rule-Based Classification: Using IF-THEN Rules for Classification

UNIT V:		

Cluster Analysis: What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods. Hierarchical Methods: Agglomerative and Divisive Hierarchical Clustering.

Outcomes:		

At the end of the course, the student will demonstrate the following. The students will be able to:

1. Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Apply preprocessing statistical methods for any given raw data
3. Discover interesting patterns from large amounts of data to analyze and extract patterns to solve problems, make predictions of outcomes
4. Comprehend the roles that data mining plays in various fields and manipulate different data mining techniques
5. Select and apply proper data mining algorithms to build analytical applications.
6. Evaluate and implement a wide range of emerging and newly-adopted methodologies and technologies to facilitate the knowledge discovery.

Text Books:		

1. Data Mining: Concepts and Techniques Second Edition Jiawei Han University of Illinois at Urbana-Champaign Micheline Kamber
2. Data Warehousing by Reema Thareja, Oxford University Press

References:

1. Data Mining by Vikram Pudi, P. Radha Krishna, Oxford Universal Press
2. J. Han, M. Kamber and J. Pei, Data Mining: Concepts and Techniques, 3rd.Edition Morgan Kaufmann, 2011
3. Introduction to data mining –G. K. Gupta, PHI
4. Data mining, Data warehouse &Olap-Berson, Tata McGraw Hill

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

DATA MINING AND DATA WARE HOUSING LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. Master data mining techniques in various applications like social, scientific and environmental context. Develop skill in selecting the appropriate data mining algorithm for solving practical problems

SYLLABUS

1. Demonstration of preprocessing on dataset student.arff.
2. Demonstration of preprocessing on dataset labor.arff.
3. Demonstration of Association rule process on dataset contactlenses.arff using Apriori algorithm.
4. Demonstration of Association rule process on dataset test.arff using Apriori algorithm.
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm.
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm.
7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm.
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm.
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means.
10. Demonstration of clustering rule process on dataset student.arff using simple k-means..

Outcomes:

1. Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Apply preprocessing statistical methods for any given raw data
3. Discover interesting patterns from large amounts of data to analyze and extract patterns to solve problems, make predictions of outcomes

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

WEB PROGRAMMING

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To provide knowledge on web architecture, web services, client side and server side scripting technologies to focus on the development of web-based information systems and web services.
2. To provide skills to design interactive and dynamic web sites.

	SYLLABUS	
UNIT I:		

Introduction to Internet: Definition of Internet – History of Internet – Advantages & disadvantages of Internet – Tools of internet - How internet works. **Introduction to WWW:** Definition of WWW – WWW tools - Web Terminology – web browser – web server, **E-Mail :** Definition of e-mail – advantages & disadvantages of e-mail, message components

UNIT II:		

Introduction to HTML: Basic HTML – HTML document structure – HTML tags – Basefont tag – title tag – body tag – Horizontal Rule Tag - Text formatting tags – Character tags - Character entities, **HTML Lists :** Ordered List , Unordered List & Definition List – Using colors – Using Images, **Hyperlinks**: Textual links, Graphical links, types of document links, anchor tag

UNIT III:		

HTML Tables – table creations tags, Nested Tables, **Frames:** Frame introduction - frame creation tags – Nested Frames – **Forms:** Form Controls : textbox, button, password, checkbox, radio button, select, text area - Processing of forms

UNIT IV:		

Introduction to Scripting: JavaScript Introduction - Simple Program - Obtaining User Inputs with Prompt Dialogs - variables – operators (arithmetic, relational, logical, increment and decrement). **JavaScript – Control Statements:** Introduction – conditional control statements (if, if…else, switch) – Repetitive statements (for, while, do…while) - break and continue Statements

UNIT V:		

JavaScript Functions: Introduction - Program Modules in JavaScript - Programmer-Defined Functions - Function Definitions - Scope Rules - JavaScript Global Functions, **Advanced HTML : Cascading Style Sheets (CSS):** Introduction – Using Styles: As an attribute, tag & external file – Defining Your own styles – **Properties and values :** properties related to Fonts, Backgrounds & colors, text , boxes & borders

Outcomes:		

1. To understand the web architecture and web services.
2. To practice latest web technologies and tools by conducting experiments.
3. To design interactive web pages using HTML and Style sheets.
4. To study the framework and building blocks of Integrated Development Environment.
5. To provide solutions by identifying and formulating IT related problems.

Text Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley.
2. Deitel & Deitel , Goldberg "Internet and world wide web – How to program", pearson educations Asia

References:

1. Paul S.Wang Sanda S. Katila, An Introduction to Web Design Plus Programming,Thomson.
2. Robert W.Sebesta, Programming the World Wide Web, Third Edition, Pearson Education.
3. Joel Sklar, Principles of Web Design, Thomson.
4. Raj Kamal, Internet and Web Technologies, Tata McGraw Hill.
5. Gopalan & Akilandeswari, Web Technology: A Developer‟s Perspective, PHI.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

WEB PROGRAMMING LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To design and implement websites with good aesthetic sense of designing.
2. To learn how XML and its related technologies function

SYLLABUS

1. Create a simple HTML page which demonstrates all types of lists.
2. Create a letter head of your college using following styles
   i. image as background
   ii. use header tags to format college name and address
3. Create a web page, which contains hyperlinks like fruits, flowers, animals. When you click on hyper links, it must take you to related web page; these web pages must contain with related images.
4. Create a hyperlink to move around within a single page rather than to load another page.
5. Create a leave letter using different text formatting tags.
6. Create a table format given bellow using row span and colspan.

RNO	NAME	MARKS				
		M1	M2	M3	M4	M5

   Insert 5 records.
7. Create a table with different formats as given bellow.
   i. Give different background and font colors to table header, footer and body.
   ii. Use table caption tag.
8. Write java script to find factorial of a number
9. Write java script to find sum of digits of a number
10. Write java script to display student details in a web page
11. Create a student Bio-Data, using forms.
12. Create a web page using following style sheets
    i. Inline style sheets.
    ii. Embedded style sheets.
    iii. External style sheets

Outcomes:

1.Students can able to understand lists, its types, header tags and image as background.
2.Students can able to create hyperlinks and the web page contains images. They can also use different types of tags.
3.Students can able to create tables using row span and column span. They can also divide a web page both horizontally and vertically.
4.Students can create their bio-data using forms. They can also create a web page using cascading styles.
5.Students are able to write java script programs by accepting values and can apply mathematical operations.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV
UNIX

Credits: 4	**Theory: 4 Hours**	**Tutorials: -**
Max Marks: 100	**External: 75 Marks**	**Internal: 25 Marks**

Course Objectives:

1. To understand Unix Operating System
2. To explore the Basic Shell Commands

SYLLABUS

Unit I:

UNIX OPERATING SYSTEM
Overview of UNIX Operating System, basic features of Unix operating System, File Structure, CPU Scheduling, Memory Management, File System Implementation of Operating System Functions in UNIX.

Unit II:

Starting of Unix and Text Manipulation and user-to-user communication User Names and Groups, Logging In, Format of Unix Commands, Changing your password, Unix Documentation.

Unit III:

Files and Directories: File permission, Basic Operation on Files, Changing Permission Modes, Standard files, Processes Inspecting Files, Operating on Files, Printing Files, Rearranging Files, Sorting Files, Splitting Files, Translating Characters, On line communication, Off line communication.

Unit IV:

EDITORS
General characteristics, adding text and Navigation, changing text, searching for text, copying and Moving text, Features of Ex, Line Editors Ex and Ed, Stream editor SED, changing several file s in SED, AWK features.

Unit V:

Shell Programming:
Programming in the Bourne and C-Shell, Wild Cards, Simple Shell program, variables, Programming Construct, Interactive Shell scripts, Advanced Features, Unix Compiler, maintaining program System Administration Define System Administration, Booting the system, Maintaining User Accounts, File System, and special files, Backup and Restoration.

Outcomes:

1. Develop knowledge on functions, Objectives, structure and Features of UNIX Operating System.
2. Knowledge to Implement and Innovative basic and advanced UNIX commands.
3. Knowledge on File system in UNIX including accesses rights and permissions on files.
4. Develop basic knowledge on editors with their characteristics, especially on vi Editor.
5. Knowledge on Shell commands and features and types of shells with proper knowledge.

References:

1. Unix and shell Programming by B.M Harwani, OXFORD University Press
2. Unix Concept and application- Sumitabhadas
3. Unix Shell Programming-Yashwant Kanetkar
4. Unix Programming Environment- RobPike
5. Unix in a Nutshell- DonillGily.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

UNIX LAB

Credits: 1	**Theory: 2 Hours**	**Tutorials: -**
Max Marks: 50	**External: 50 Marks**	**Internal:**

Course Objectives:

1. To introduce Basic Unix general purpose Commands
2. To learn network Unix commands.
3. To learn C programming in Unix editor environment.
4. To learn shell scripts.

SYLLABUS

1. Execute of various file/directory handling commands.
2. Write a Simple shell script for basic arithmetic and logical calculations.
3. Write Shell scripts to check various attributes of files and directories.
4. Write Shell scripts to perform various operations on give n strings.
5. Write Shell scripts to explore system variables such as PATH, HOME etc.
6. Write Shell scripts to check and list attributes of processes.
7.Execute various system administrative commands
8.Write awk script that uses all of its features.
9.Use seed instruction to process /etc/password file.
10.Write a shell script to display list of users currently logged in.
11.Write a shell script to delete all the temporary files.
12.Write a shell script to search an element from an array using binary searching.

Outcomes:

1.Able to differentiate between windows and UNIX OS, features of UNIX OS.
2.Knowledge on basic and advanced UNIX Commands.
3.Learn to implement system calls in vi editor.
4.Learn to implement Scheduling and page replacement algorithms as per UNIX OS.
5.Learn to implement Shell commands and develop skills on shell programming.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

DATA ANALYTICS USING R

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Exposure to theory as well as practical knowledge through R used in data analytics.
2. Fundamental basics of statistics used in analyzing the data
3. How to find the pattern in the given dataset
4. How to interpret the data graphically
5. How to apply different types of algorithms for the given dataset

	SYLLABUS	
UNIT I:		

Introduction to Data analytics: Overview of Bigdata, Need of Data Analytics, Applications of Data Analytics, Datasets, tools for data analytics

Basic Statistics**: Mean, Median, mode, Standard Deviation, Variance, Correlation.** Distribution: **normal, binomial.**

UNIT II:		

Basic Analysis Techniques: **Chi-Square Test, t-Test.** Data Analysis Techniques: **Linear and Logistic Regression.**

Introduction to R: R overview and history, Basic features of R, Installing R, packages in R, Getting started: Window section of RStudio, first interaction, command line versus scripts, comments. Variables in R: Naming variables, assigning values to variables, finding variables, removing variables, operators.

R Data Structures: Vectors, Character Strings, Matrices, Lists, Data Frames, and Classes.

UNIT III:		

Input of Data: input of data from terminal, input of data through R-objects. **Output functions:** print () function, cat () function. **In-Built functions in R:** Mathematical functions, String functions. **User defined functions** – function without arguments, function with arguments.

Decision making structure: simple if statement, if-else statement, switch statement. **Loops:** while loop, for loop, Repeat loop.

UNIT IV:		

Data Types of R

Vectors: class of a vector, Elements of a vector, acceding vector elements, functions for vectors, obtaining the Length of a Vector. **Common vector operations:** Arithmetic & logical operations, Vector Indexing, using all () and any () functions, Vectorized operations, NA and NULL values.

Matrices: creating a matrix, accessing matrix elements, functions for matrices, matrix indexing, filtering on matrices. **Arrays:** creating an array, accessing elements of an array, functions for array.

UNIT V:		

Lists: creating a list, accessing list elements, functions for list, General list operations, list indexing, adding and deleting list elements.

Import and Export of data: Import and export of data in excel file:reading from excel format, write to excel format.

Data Visualization techniques: Introduction, pie chart, bar chart, scatter and box plots.

Outcomes:		

1. Data-Visualization tools and techniques offer executives and other knowledge workers new approaches
2. Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context.
3. Patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization software.
4. It isn't just the attraction of the huge range of statistical analyses afforded by R that attracts data people to R. The language has also developed a rich ecosystem of charts, plots and visualizations over the years.

Text Books:		

1. Data Analytics with R, WILEY Publishing, Dr.Bharti Motwani.
2. The Art of R Programming by Norman Matlof, No starch press, SAN FRANSISCO,2011.
3. Data Analytics using R, McGrawHill Publications, Seema Acharya

References:

1. Rumset D. J. (2010): Statistical Essentials for Dummies. Hoboken: Wiley Publishing
2. R for Data Science: Import, Tidy, Transform, Visualize, and Model Databy adley ickham , O'Reilly

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

DATA ANALYTICS USING R LAB

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. Exposure to theory as well as practical knowledge through R used in data analytics.
2. Fundamental basics of statistics used in analyzing the data
3. How to find the pattern in the given dataset
4. How to interpret the data graphically
5. How to apply different types of algorithms for the given dataset

SYLLABUS

1. Write a program in R. To compute the product of two values
2. Write a program in R. to check whether the given number is even or odd.
3. Write a program in R. Sum of natural numbers.
4. Write a program in R. Find the factorial.
5. Exporting data to Excel, Text File
6. Mean, Median, Standard Deviation, Variance, Correlation in R
7. Correlation in R:Pearson & Spearman with Matrix Example
8. T Test in R
9. Chi-Square Test in R
10. Prediction using linear regression and visualizing the regression graphically
11. Prediction using logistic regression and visualizing the regression graphically
12. Bar chart in R

Outcomes:

1. Learn R programing language with simple example.
2. Ability to write different programs in R.
3. Familiar to apply statistical methods in R.
4. Analyze various tests in R .

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

OBJECT ORIENTED SOFTWARE ENGINEERING

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Illustrate basic taxonomy and terminology of the software engineering.
2. Plan and monitor the control aspects of project.

SYLLABUS

UNIT I:

The Scope of Object Oriented Software Engineering: Historical Aspects, Economic Aspects, Maintenance Aspects, Requirements, analysis and design aspects, the object oriented Paradigm, Terminology, Ethical Issues.

Software Life Cycle Models: Software Development In Theory, Risks and other aspects of Iteration and Incrementation, Managing Iteration and Incrementation, other Life Cycle Models: Code and Fix, Waterfall, Rapid Prototyping, Open Source, Agile Processes, Synchronize and Stabilize, Spiral Models, Comparison of Life Cycle Models.

UNIT II:

The Software Process : The Unified Process, Iteration and Incrementation, The Requirements Workflow, The Analysis workflow, The Design Workflow ,The Implementation workflow, the test workflow, Post Delivery Maintenance, Retirement, the phases of the unified process, one-versus two-dimensional life cycle models, improving the software process, capability maturity models, costs and benefits of software process improvement.

UNIT III:

Models t o O b j e c t s : What is a module? Cohesion, Coupling, Data Encapsulation, Abstract Data Types, Information Hiding, Objects, Inheritance, Polymorphism and Dynamic Binding, The Object-Oriented Paradigm.
Reusability and Portability: Objects and Reuse, Reuse during design and implementation reuse and post-delivery maintenance, portability, techniques for achieving portability.
Planning and Estimating: planning and the software process, Estimating duration and cost.

UNIT IV:

The Requirements workflow: Determining what client needs , overview of the requirements, understanding the domain, the business model, initial requirements, rapid prototyping , human factors, reusing the rapid prototype, metrics for the requirement workflow.
The Analysis Workflow: the analysis workflow, extracting the entity classes.
The Design Workflow: Object –Oriented Design, the design workflow, formal techniques for detailed design, real time design techniques.

UNIT V:

The implementation workflow: choice of programming languages, good programming practice, coding standards, code reuse, integration, the implementation workflow.
Testing: Quality Issues, Non – Execution based testing, execution based testing, what should be tested?, testing versus correctness proofs. Test case selection, Black Box Unit Testing techniques, Glass-Box Unit Testing Techniques.

Outcomes:		
1. Explore the basic concepts of software engineering. 2. Choose appropriate life cycle model for a project. 3. Implement the phases of the traditional software development process. 4. Design various test cases for a software product. 5. Analyze different architectural views.		
Text Books:		
Stephen R.Schach -Object Oriented Software Engineering McGraw Hill Higher Education		
References:		
Timothy C.Lethbridge, Robert Language Object Oriented Software Engineering		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester IV

OBJECT ORIENTED SOFTWARE ENGINEERING LAB

Credits: 1	**Theory: 2 Hours**	**Tutorials: -**
Max Marks: 50	**External: 50 Marks**	**Internal:**

Course Objectives:

1. Illustrate basic taxonomy and terminology of the software engineering.
2. Plan and monitor the control aspects of project.

SYLLABUS

1 Online Examination System.
2 Online Railway Reservation.
3 Library Maintenance System.
4 Any E-Commerce Portal.
5 Biometric Attendance System.

Outcomes:

1. Understand the basic concepts of software engineering.
2. Applied appropriate life cycle model for a project.
3. Implement the phases of the traditional software development process.
4. Design various test cases for a software product.
5. Analyze different architectural views.

BACHELOR OF COMPUTER APPLICATIONS

Syllabi

With effect from 2022-23 admitted batch

III YEAR I SEMESTER

Paper Code	Course	Teaching Hours	Sem End Exam	Mid Sem Exam*	Total Marks	Credits
BCA3.1.1	Networks	4	75	25	100	4
BCA3.1.2	Networks Lab	2	50	0	50	1
BCA3.1.3	Android Programming	4	75	25	100	4
BCA3.1.4	Android Programming Lab	2	50	0	50	1
BCA3.1.5	Artificial Intelligence	4	75	25	100	4
BCA3.1.6	Artificial Intelligence Lab	2	50	0	50	1
BCA3.1.7	**Elective-I [Theory]:** Python PHP	4	75	25	100	4
BCA3.1.8	**Elective-I [Lab]:** Python Lab PHP Lab	2	50	0	50	1
BCA3.1.9	**Elective-II [Theory]:** Principles and Techniques of Animation Computer Graphics	4	75	25	100	4
BCA3.1.10	**Elective-II [Lab]:** Principles and Techniques of Animation Lab Computer Graphics Lab	2	50	0	50	1
BCA3.1.11	**Elective-III [Theory]:** Cloud Computing Mobile Computing	4	75	25	100	4
BCA3.1.12	**Elective-III [Lab]:** Cloud Computing Lab Mobile Computing Lab	2	50	0	50	1
Total		**36**	**750**	**150**	**900**	**30**

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
COMPUTER NETWORKS

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To provide an introduction to the fundamental concepts on data communication and the Design of computer networks.
2. To get familiarized with Transmission media.
3. To get familiarized with the basic protocols of computer networks.

SYLLABUS

UNIT I: **14 HOURS**

Basics of Computer Network: Definition, ARPANET, Internet, Uses of Computer Networks, Network Topology and their various Types; Types of Network: LAN, MAN, WAN; **Network devices:** Hub, Switch, Router, Repeater, Gateway, NIC, Bridge **Communications Types:** Synchronous, Asynchronous; Modes of Communication: Simplex, Half Duplex, Full Duplex; Protocols and Standards.

UNIT II: **10 HOURS**

Network Models: ISO-OSI Reference Model: Functions of each Layer, Internet (TCP/IP) Reference Model, Comparison of ISO-OSIand TCP/IP Model.
Physical Layer: Basics for Data Communications and Analog and Digital Signals. Transmission media: Guided and Unguided media, twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT III: **12 HOURS**

Data link layer: Data framing, functions of datalink layer, logical link control, Media Access Control, Ethernet, Bluetooth,error detection and correction- CRC, Parity, Checksum.
The Network Layer: Design issues, Network Addressing-class full and class less, Subnetting, IPv4, IPv6 addressing, DHCP, forwarding of IP packets, Internet Protocol, Routing, Network Layer Protocols- ARP, ICMP.

UNIT IV: **10 HOURS**

The Transport Layer: Transport layer protocols: Connection oriented and Connection less services, Transport Protocols-Congestion Controls in Transport Layer,
The Internet Transport Protocols: UDP- Introduction to UDP, **TCP**-Introduction to TCP, The TCP Service Model, The TCPProtocol, The TCP Segment Header.

UNIT V: **4 HOURS**

The Application Layer: DNS – The Domain Name System-The DNS Name Space, Resource Records, Name Servers, **ElectronicMail**-Architecture and Services, The User Agent, HTTP, FTP, SMTP, BOOTP, World Wide Web, Static Web Documents, Dynamic web Documents.

Outcomes:

1. Understands the different network components in a communication system and their respective roles.
2. Gains the technical issues related to the local Area Networks.
3. Familiarize with Network Layer Functionalities.
4. Understands the transport layer protocols like UDP and TCP.
5. Learns the importance of application layer protocols DNS, E-mail and WWW.

Text Book:

Andrew S. Tanenbaum, "Computer Networks", Fifth Edition, Pearson Education.

References:

1. Bhushan Trivedi, Computer Networks, Oxford University Press
2. James F.Kurose, Keith W.Ross, "Computer Networking", Third Edition, Pearson Education
3. Behrouz A Forouzan, "Data Communications and Networking", Fourth Edition, TMH (2007).
4. Kurose & Ross, "Computer Networks" – A Top-down approach featuring the Internet", A Top-down approach featuring the Internet",

Gayatri Vidya Parishad College for Degree and PG Courses (Autonomous)
B.C.A-Semester V
COMPUTER NETWORKS LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. The student will be able to know basic assembling and troubleshooting.
2. Build an understanding of the fundamental concepts of computer networking.
3. Preparing the student for Advanced courses in computer networking.
4. Allow the students to gain expertise in some specific tools of Networking.

SYLLABUS

Week 1: PC Assembling and Dissembling.

Week 2: network types: work-group and domain configuration.

Week 3: Study of Network Devices in Detail.
- i. Non-Intelligent devices.
- ii. Intelligent devices.

Week 4: Study of Different Types of Network Cables –
- i. Cross Cabling.
- **ii.** Straight Cabling.

Week 5: Study of Basic Network Oriented Commands

Week 6: Study Classification of IP Addresses

Week 7: Study of **Subnetting**

Week 8: Configure a Network Topology Using **CISCO Packet Tracer**

Week 9: Study of network servers.
- i. Domain Control (DC) Server.
- ii. DNS.
- iii. DHCP.
- iv. Name Server.
- v. Load Balancer.

Outcomes:

1. To understand the difference between serial communication and parallel communication with direct cable software component.
2. To learn the importance of Dialup networking and HyperTerminal.
3. To understand the concepts of different network configurations using star Topology.
4. To acquire knowledge on Cisco-packet tracer simulator by configuring the different applications.

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B.C.A- Semester V
Android Programming

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Covers introductory mobile application development for the Android Operating System using XML and Java.
2. Includes developing simple applications that could run on Android phones and tablets.
3. Covers Android application development phases, terminologies, application design, and coding.

	SYLLABUS	
UNIT I:		**10 Classes**

Introduction: What is Android?, Android Architecture, Setting Android Environment, Android SDK Manager & required Packages, Using Android Studio, Android Virtual Device(AVD), Creating First Android Application/Project, Android Application Structure and Package Structure, Working with AndrodManifest.xml.

UNIT II:		**9 Classes**

Introduction to Gradle, Running the Application, Activity Life Cycle, Views, Layouts and more. Introduction to Views: TextView, EditText View, RadioButton and CheckBox View, Button View, ImageView and ImageButton View, Toast, Notifications.

UNIT III:		**11 Classes**

Introduction to Layouts/ViewGroups: Linear Layout, Relative Layout, Tabular Layout, Hierarchical Layout Arrangements, Adapter and Adapter View, Using ListView and GridView, Time Picker and Date Picker View.

UNIT IV:		**10 Classes**

Spinner in Android, Working with Spinners, Margin and Padding, Working with EditText and TextView, RadioGroup, RadioButton and CheckBox, Auto CompleteTextView in Android, Android Core and Projects.

UNIT V:		10 **Classes**

Location Based Services: Sending Email, Sending SMS, Phone Calls Activity in Android, Intents in Android, Introduction to Fragments, Working with Fragments, File Access, Using External Storage,
SQLite database.

Outcomes:

1. Install and configure Android application development tools.
2. Design and develop user Interfaces for the Android platform.
3. Save state information across important operating system events.
4. Apply Java programming concepts to Android application development.

Text Books:

4. Android Programming for Beginners by John Horton Publisher: Packt Publishing Guides.

References

1. Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress.
2. Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A- Semester V
Android Programming Lab

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50Marks	Internal:

Course Objectives:

This lab course will provide opportunity to the learners to implement the Concepts and techniques learned in Android Studio using Java Language. The Lab is designed to create basic and advanced android Apps for students.

List of Programs for Android Programming Lab

1. Installation of Android studio
2. Development Of Hello World Application
3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button
4. Create a screen that has input boxes for User Name, Password, Address, Gender(radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).
5. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity.
6. Design an android application Send SMS using Intent.
7. Create an android application using Fragments.
8. Design an android application Using Radio buttons.
9. Design an android application for menu.
10. Create a user registration application that stores the user details in a database table.

Outcomes:

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

1. How to install and configure Android Studio.
2. Implement basic Android Applications.
3. How to apply various tools in Android Studio for developing an Android application.
4. How to apply various Layouts in Android Studio for designing an Android application.
5. How to send an SMS through Android application.
6. Able to connect SQLite database.

Text Books:

1. Android Programming for Beginners by John Horton Publisher: Packt Publishing Guides.

References

1. Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress.
2. Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
ARTIFICIAL INTELLIGENCE

Credits: 4	Theory: 5 Hours	Tutorials: -
Max Marks: 100	External: 75Marks	Internal: 25 Marks

Course Objectives:

1. Discuss about AI related fields, Problems and Problem Characteristics
2. Evaluation on Searching Techniques.
3. Identify different types and approaches of Knowledge representation.
4. Understand Uniformed and Informed Searching Techniques
5. Students should learn about Planning and Learning techniques

SYLLABUS

Unit I:

Introduction: what is A. I –Definitions – foundations and history of A. I- related fields and applications and goal of A.I. Distinguishes between A.I and conventional programming languages and Programming Languages - LISP and PROLOG.

Problem solving Through A.I: Definitions of State space representation and problem reduction with examples, Analyzing problems and its characteristics.

Unit II:

Searching Techniques: Uninformed search strategies (Brute Force Search)- BFS & DFS, Informed search strategies (Heuristic Search)-Generate and Test, Hill Climbing, Best-First Search, A* algorithm, constraint satisfaction, Means-Ends Analysis.

Unit III:

Knowledge Representations: Representations and Mappings, Knowledge Representation approaches, Types of knowledge's, Key issues in Knowledge Representation, Procedural and Declarative knowledge.

Advanced Knowledge Representations: Semantic Nets, Frames, Scripts and Conceptual dependency.

Unit IV:

Logical Reasoning: Propositional logic – Inference Rules – first-order predicate logic (FOPL), Conversion of Clausal forms, Resolution Principle.

Matching: Definition of Matching, Types of matching's, RETE Matching Algorithm

UNIT V:

Planning: Planning Definition – Components of Planning, Types of planning's. Terminology of planning, Identifying solutions for state-space search and goal stake planning.

Learning: Introduction to learning – Types of learning's - Decision trees learning.

Outcomes:

1. Ability to understand the basics of Artificial intelligence, importance and Applications of A.I.
3. Analyzes the problems in A.I and can solve general purpose problems through A.I
3. Learns the concepts of Knowledge Representation and logics.
4. Gains the knowledge in planning's to solve the real-world problems.
5. Understands the environment learning systems and learn from experiences.

Text Book:

Introduction to Artificial Intelligence – Dawn W Patterson. Pearson Education.

References:

1. Introduction to Artificial Intelligence -ElainRitch and Knight.
2. David Poole, Alan Mackworth, Randy Goebel, (2004), "Computational Intelligence: a logical approach", Oxford University Press.
3. Luger.G, (2002), "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
4. Nilsson.J, (1998), "Artificial Intelligence: A new Synthesis", Elsevier Publishers

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
ARTIFICIAL INTELLIGENCE LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives: The course is designed to develop skills to implement various techniques of artificial Intelligence. It strengthens the ability to the students to solve the problems and apply the suitable decision plans for the given real-world problem. It enables them to gain knowledge in practical applications of artificial Intelligence.

SYLLABUS

1. Write a program to implement to find factorial given number
2. Write a program to implement to find Average of given numbers.
3. Write a program to implement DFS
4. Write a program to implement BFS.
5. Write a Program to find the solution for travelling salesman Problem
6. Write a program to implement 8 puzzle problems.
7. Write a program to implement A* Algorithm
8. Write a program to implement Hill Climbing Algorithm
9. Write a program to implement means end Analysis
10. Build a Chatbot using AWS Lex, Pandora bots.

Outcomes:

After completion of course, student will be able to:

4. Implement knowledge to solve the Problems
5. Implement various informed searching techniques.
6. Implement various Heuristic searching techniques.
7. Implement planning's to solve the real world Problems
5. Implement Decision tree learning

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
PYTHON

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To discuss about python language basics, operators and data structures like lists, tuples, sets and dictionaries.
2. To develop programs for file operations and module creations.
3. To explain the concepts of exception handling.
4. To implement programs using GUI and CGI technology.
5. To discuss the data base operations using MySQL API with python programming.

SYLLABUS

UNIT I: **9 Classes**

Python basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types **Numbers -** Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules - **Sequences -** Strings, Lists, and Tuples, Mapping and Set Types.

UNIT II: **9 Classes**

Files: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, File System, File Execution, Persistent Storage Modules, Related Modules **Modules:** Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules.

UNIT III: **11 Classes**

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)? Why Exceptions at All?, Exceptions and the sys Module, Related Modules.

UNIT IV: **10 Classes**

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs **Web Programming:** Introduction, Web Surfing with Python, Creating Simple Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application.

UNIT V: **11 Classes**

Database Programming: Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers (ORMs), Related Modules.

Outcomes:

1. Acquires knowledge on implementation of basics programs, operators and data structures like lists, tuples, sets and dictionaries.
2. Develop knowledge on files and its operations.
3. Ability to implement various GUI programming and CGI programs.
4. Acquires knowledge on database and its applications.
5. Familiarizes with various ORM and related techniques.

Text Books:		
Python Programming for the Absolute Beginner,Third Edition by Michael Dawson		
References 1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson. 2. Think Python, Allen Downey, Green Tea Press. 3. Introduction to Python, Kenneth A. Lambert, Cengage. 4. Python Programming: A Modern Approach, Vamsi Kurama, Pearson. 5. Learning Python, Mark Lutz, O'. 6. Web sources suggested by the teacher concerned and the college librarian including reading material.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
PYTHON LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To develop programs on basic programs.
2. To develop programs for data structures like lists, tuples, sets and dictionaries.
3. To explain the concepts of exception handling.
4. To implement programs using GUI with tkinter module.
5. To implement the data base operations using MySQL API with python programming.

SYLLABUS

1. Write a python program to calculate a student's total marks, percentage, and grades. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :

   Grade A: Percentage >=80
   Grade B: Percentage>=70 and <80
   Grade C: Percentage>=60 and <70
   Grade D: Percentage>=40 and <60
   Grade E: Percentage<40

2. Write a python program to display the first n terms of the Fibonacci series.
3. Write a python program to calculate the sum and product of two compatible matrices.
4. Write a function that takes a character and returns True if it is a vowel and False otherwise.
5. Write a menu-driven program to create mathematical 3D objects
   I. curve II. sphere III. cone IV. arrow V. ring VI. Cylinder.
6. Write a python program to read n integers and display them as a histogram.
7. Write a python program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/ (t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.
8. Write a program that takes two lists and returns True if they have at least one common member.
9. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
10. Try to configure the widget with various options like bg=" green", family=" times", and size=20.
11. Write a Python program to read the last 5 lines of a file.
12. Design a simple database application that stores the records and retrieves the same.

Outcomes:

1. Acquires knowledge on implementation of basics programs, operators and data structures like lists, tuples, sets and dictionaries.
2. Develop knowledge on files and its operations.
3. Ability to implement various GUI programming and CGI programs.
4. Acquires knowledge on database and its applications.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V
PHP

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To discuss about PHP variables, operators and control statements.
2. To develop programs for functions in PHP.
3. To explain the concepts of Arrays and Strings.
4. To implement programs using PHP Forms.
5. To discuss the data base operations using MySQL with PHP programming.

SYLLABUS

UNIT I: **9 Classes**

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. **Working with Functions**: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

UNIT II: **9 Classes**

Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, **Dates and Time:** Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT III: **11 Classes**

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. **Working with Cookies:** Introducing Cookies, Setting a Cookie with PHP.

UNIT IV: **10 Classes**

Working with Files and Directories: Including Files with inclue(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

UNIT V: **11 Classes**

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. **Creating an Online Address Book:** Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

Outcomes:

1. Acquires knowledge on implementation of basics programs of PHP.
2. Develop knowledge on PHP functions.
3. Ability to implement various PHP Forms.
4. Acquires knowledge on database and its applications using PHP.
5. Familiarizes with various file operation and its techniques.

Text Books:		
1. PHP, MySQL, JavaScript & HTML5 All-in-One For Dummies Published by John Wiley & Sons, Inc		
References 1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education (2007). 2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill 3. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly, 2014 4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006). 5. Web resources: e. http://www.codecademy.com/tracks/php f. http://www.w3schools.com/PHP g. http://www.tutorialpoint.com 6. Other web sources suggested by the teacher concerned and the college librarian including reading material.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V

PHP LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To discuss about PHP variables, operators and control statements.
2. To develop programs for functions in PHP.
3. To explain the concepts of Arrays and Strings.
4. To implement programs using PHP Forms.
5. To discuss the data base operations using MySQL with PHP programming.

SYLLABUS

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display today's date.
3. Write a PHP program to display the Fibonacci series.
4. Write a PHP Program to read the employee details.
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Create Website Registration Form using a text box, check box, radio button, select, submit button. And display user inserted value in the new PHP page.
8. Write a program to keep track of how many times a visitor has loaded the page.
9. Write a PHP application to add new Rows in a Table using MySQL.
10. Write a PHP application to modify the Rows in a Table using MySQL.
11. Write a PHP application to delete the Rows from a Table using MySQL.
12. Write a PHP application to fetch the Rows in a Table using MySQL.
13. Develop a PHP application to implement the following Operations using MySQL.
    - i. Registration of Users.
    - ii. Insert the details of the Users.
    - iii. Modify the Details.
    - iv. Transaction Maintenance.
        - a) No of times Logged in
        - b) Time Spent on each login.
        - c) Restrict the user for three trials only.
        - d) Delete the user if he spent more than 100 Hrs of transaction.

Outcomes:		
1. Acquires knowledge on implementation of basics programs of PHP. 2. Develop programming knowledge on PHP functions. 3. Ability to implement various PHP Forms. 4. Acquires programming knowledge on database and its applications using PHP.		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A- V Semester

Principles and Techniques of Animation

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To understand the history of Animation.
2. To understand skills for an Animation Artist
3. To understand the fundamentals of Animation - Traditional Animation to CGI Animation till date.
4. To understand Different type of Animation.
5. To apply the knowledge of Principles of Animation using Macromedia Flash.

SYLLABUS

UNIT I: 7 **Classes**

What is Animation: Its definition, early examples of Animation. History of Animation: Stop Motion Photo Animation, Zoetrope, Thaumatrope, Cell and Paper Animation, early Disney's Cell Animation Processes.

UNIT II: **7 Classes**

Types of Animation: Cell Animation, Stop Motion Animation, Computer Animation, 2-D Animation, 3-D Animation. **Skills for an Animation Artist:** Visual and creative development of an Artist , importance of observation with minute details, efficiency to draw gestures, facial expressions, good listener, hard work and patience, creative and innovative.

UNIT III: 8 **Classes**

Basic Principles of Animation: Illusion of Life, straight action and pose to pose Timing, Exaggeration, Drama and Psychological Effect, Fade in and Fade out, Squash and Stretch, Anticipation, Staging, follow through and overlapping action, Arcs, Solid Drawing ,Appeal, slow in and slow out, Secondary Action.

UNIT IV: 8 **Classes**

Various Terms: Animation Drawings/Cells, Rough Drawings , Clean ups, Color reference drawings, Layout, Model Sheet, Key Drawings and in Betweens, Master Background, Concept Piece, Character drawing , Story Board. **Animation Production Process:** Understand Animation Requirements, Basic steps in Preproduction, Production and Post-Production.

UNIT V: 10 **Classes**

Macromedia Flash: Introduction, What is Flash, Uses and Features of Flash, How to start Macromedia Flash, Versions of Macromedia Flash, Flash Tools: Top section tools(14 tools), View tools, Color tools, Option tool(Tool Modifiers), Panels: Timeline Panel, Tools Panel, Library Panel, Canvas, Properties Panel.

Outcomes:

1. To Understand the History, development and differentiation of different Animation.
2. To incorporate and assess the principles of animation.
3. To analyse and differentiate the type of Animation.
4. To interpret the steps involved in the preproduction, production and post-production.
5. To construct and create an animation using Macromedia Flash.

Text Books:

1.The Illusion of Life: Disney Animation - Frank Thomas and Ollie Johnston (1995)

References :

1. Cartoon Animation - Preston Blair (1994)
2. The Animator's Survival Kit - Richard Williams (2009)

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A- V Semester

Principles and Techniques of Animation Lab

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

6. To understand the Graphic Functions in C.
7. To learn about tools in Macromedia Flash.
8. To understand different panels in Flash
9. To learn about designing and Moving Objects.

Cycle-1

1. Write a C Program to draw a Hut on a Screen.
2. Write a C Program for Bouncing Ball (Animation).
3. Write a C Program for Moving Car (Animation).
4. Write a C Program to Draw Stars in Night Sky (Animation)
5. Write a C Program to Draw a smiling face which appears at random positions on the screen.
6. Write a C Program to Produce Animation Effect of Triangle Transform into Square and then into Circle.

Cycle-2

1. Write a Flash program for Bouncing Ball.
2. Write a Flash Program to Move an Object from one frame location to another frame (Motion tween, Shape tween, Color tween).
3. Write a Flash program to drop the Text (like Rain Drops).
4. Write a Flash program to Move an Object by using Guided Layer.
5. Write a Flash program for Butterfly Flipping.
6. Write a Flash Program to Control the Moving Object by using Action Buttons.

Outcomes:

1. Analyse all 2D-Graphics functions
2. Utilizing perspective drawing tools to design objects.
3. Analyse timing and sequencing of Animation.

Text Books:

1.The Illusion of Life: Disney Animation - Frank Thomas and Ollie Johnston (1995)

References :

1. Cartoon Animation - Preston Blair (1994)
2. The Animator's Survival Kit - Richard Williams (2009)

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A- V Semester

Subject: Computer Graphics

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. Introduce the structure of an Interactive Computer Graphics.
2. Idea on Input and Output Primitives.
3. Analyse on basic scan conversion algorithms
4. Analyze 2D & 3D Geometrical Transformations.
5. Idea about basic Projections

	SYLLABUS	
UNIT I:		10 **Classes**

Introduction: What is Graphics, Applications of Computer Graphics, Video Display Devices: Cathode –Ray Tubes, Raster-Scan and Random-Scan Displays, Color CRT Monitors, Direct-View Storage Tubes, Flat-Panel Displays, Input Devices, Hard-Copy Devices, Graphics Software: Coordinate Representations, Graphics Functions, Software Standards, PHIGS Workstations.

UNIT II:		**8 Classes**

Output Primitives: point, lines, Line-Drawing Algorithms: DDA, Bresenham's, Circle-Generating Algorithms: Properties of Circles, Midpoint Circle Algorithm, Attributes of Output Primitives: Line Attributes, Curve Attributes, Character Attributes.

UNIT III:		**10 Classes**

Two-Dimensional Geometric Transformation: Basic Transformations: Translation, rotation, Scaling, Composite Transformations: Translations, Rotations, General Pivot-Point Rotation, General Fixed-Point Scaling, Other Transformations: Reflection, Shear, Transformation Functions.

UNIT IV:		**12 Classes**

Two-Dimensional Viewing: Viewing Pipeline, Window- to-Window Coordinate Transformation, Two-Dimensional Viewing Functions, Clipping Operations: Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland –Hodgeman Polygon Clipping, Text Clipping, Exterior Clipping.

UNIT V:		**10 Classes**

Three-Dimensional Geometric Transformations: Translation, Rotation, Scaling, Reflections, Shearing.
Three-Dimensional Viewing: Viewing Pipeline, Projections: Parallel and Perspective Projections.

Outcomes:

1. Understand the basics of computer graphics and Applications of Computer Graphics.
2. Learn various scan conversion algorithms.
3. Learn to use 2D & 3D Geometric Transformations.
4. Extract with different clipping methods and Projections.

Text Books:

2. Android Programming for Beginners by John Horton Publisher: Packt Publishing Guides.

References

3. Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress.
4. Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A- V Semester

Subject: Computer Graphics Lab

Credits: 1	Theory: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. Understand the need of developing graphics application
2. Learn algorithmic development of graphics primitives like: line, circle, polygon etc.
3. Learn the representation and transformation of graphical images and pictures.

List of Programs for Computer Graphics Lab

11. Introduction and Graphics Functions(Graphics.h header file from C language)
12. Program to implement DDA Line Drawing Algorithm
13. Program to implement Bresenham's Line Drawing Algorithm
14. Program to implement 2D-Translation.
15. Program to implement 2D-Rotation.
16. Program to implement 2D-Scaling.
17. Program to implement Reflection of a Point, Line.
18. Program to implement Line Clipping
19. Program to implement Polygon Clipping.
20. Program to implement 3D- Transformations (Any one Basic transformation)

Outcomes:

1. Draw Geometric primitives using OpenGL.
2. Implement basic transformations on objects.
3. Implement clipping algorithm on lines and Polygons.

Text Books:

1 Android Programming for Beginners by John Horton Publisher: Packt Publishing Guides.

References

1 Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress.

2 Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons.

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V

Cloud Computing

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet.
2. The student will understand the cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

	SYLLABUS	
UNIT I:		**(8 Hours)**

Introduction to Cloud Computing: Evolution and History of Cloud Computing, Introduction to Cloud Computing, Why Cloud Computing is Becoming Highly Important, Features of Cloud Computing, Cloud Computing for various users, Advantages of Cloud Computing, Limitations of Cloud Computing.

UNIT II:		**(12 Hours)**

Cloud Models and Types: The NIST Model, Cloud Cube Model, Deployment Models, Service Models. Layers and Types of Cloud, Components of Cloud Computing, Cloud Computing Service Providers.
Software as a Service (SaaS): Software as a Service , Evolution of SaaS ,Brief Introductory part of Software as a Service , SaaS Unification Technologies , SaaS Integration Products and Technologies, SaaS Product Selection Criteria, SaaS Integration Services, Advantages of SaaS

UNIT III:		**(10 Hours)**

Platform as a Service (PaaS): Introduction to PaaS, Evolution of PaaS, PaaS Service Providers- Acquia Cloud, Amazon AWS, Amazon Elastic Beanstalk, Google App Engine, Force.com, PaaS Application Framework, PaaS Operator Verbs, PaaS Developer Verbs, Advantages and Challenges of PaaS

UNIT IV:		**(12 Hours)**

Infrastructure as a Service (IaaS): Evolution, IaaS Architecture- Advantages and Disadvantages of Infrastructure as a Service, SAN model, IaaS Providers, IaaS Architecture,.
Data in Cloud : Evolution of Network Storage in Cloud, Data as a Service, Database as a Service, Cloud Based Data Storage, Advantages and Limitations of Cloud Based Storage Solution, Cloud Based Data Storage Service Providers

UNIT V:		**(8 Hours)**

Virtualization: Introduction to Virtualization and its Technical Evolution, History of Virtualization, Types of Virtual Machines, Advantages of Virtualization, Components of Virtualization, Types of Virtualization.

Outcomes:

1. Compare the strengths and limitations of cloud computing.
2. Identify the architecture, infrastructure and delivery models of cloud computing.
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability.
6. Design Cloud Services and Set a private cloud.

Text Books:		
1. Text books: Handbook of Cloud Computing By Dr.Anand Nayyar (Editor), First Edition 2019, BPB Publication, India.		
References 1. 1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter 2. TATA McGraw- Hill , New Delhi – 2010 3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008 4. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier. 5. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH		

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V

Cloud Computing LAB

Credits: 1	**Lab: 2 Hours**	**Tutorials: -**
Max Marks: 50	**External: 50 Marks**	**Internal:**

Course Objectives:

The course is designed to develop skills to design and analyze the cloud platform It strengthens the ability to the students to design his/her own website in the cloud. It enables them to gain knowledge in practical applications of cloud platforms.

SYLLABUS

1. Create a word document of your class time table and store locally and on cloud with doc and pdf format.
2. Prepare a PowerPoint on cloud on topic of your choice.
3. Create your resume in a neat format using Google cloud
4. Install OpenStack and use it as Infrastructure as a Service and use technology ownCloud.
5. Installing and using identity management feature of OpenStack.
6. Write a program for web feed using PHP, HTML.
7. Installing and using security feature of own Cloud.
8. Installing and using Administrative features of own Cloud.
9. Create a website using Google Sites.
10. Case study on Amazon EC2.

Outcomes:

After completion of course, student will be able to:

7. Create a documents in Cloud platform.
8. Manage organize and manipulate the files in Cloud.
9. Knows how to use Open Stack and creates his/her own cloud.
10. Knows how to create his own websites in the cloud

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester V

Mobile Computing

Credits: 4	Theory: 4 Hours	Tutorials: -
Max Marks: 100	External: 75 Marks	Internal: 25 Marks

Course Objectives:

1. To study the emerging technologies in the context of wireless networks
2. The student will understand the mobile computing environment
3. The student will understand the mobile computing platform Android Studio.

	SYLLABUS	
UNIT I:		**(10 Hours)**

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission-signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices.

UNIT II:		**(10 Hours)**

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture. Wireless medium access control, CDMA,

3G, 4G and 5G Communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-20003G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks, 5G Networks.

UNIT III:		**(12 Hours)**

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP

Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT IV:		**(8 Hours)**

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server.

UNIT V:		**(10 Hours)**

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

Outcomes:		

1. Interpret Wireless local area networks (WLAN): MAC design principles, 802.11 WIFI
2. Discuss fundamental challenges in mobile communications and potential Techniques in GSM
3. Demonstrate Mobile IP in Network layer.
4. Elaborate TCP/IP Protocols and database issues.
5. Illustrate different data delivery methods and synchronization protocols.
6. Develop applications that are mobile-device specific and demonstrate current Practice in mobile computing contexts

Text Books:		

1) Mobile Computing, 2nd edition, Raj kamal, Oxford,2011

2) Mobile Computing, Technology Applications and Service Creation, 2nd Edition, Asoke K Talukder, Hasanahmed, Roopa R Yavagal, McGraw Hill,2017

References

1) "Principles of Mobile Computing," 2nd Edition, UWE Hansmann, Lother Merk, Martin S.

Nocklous, Thomas Stober, Springer.2003

Gayatri Vidya Parishad College for Degree and PG Courses (AUTONOMOUS)
Department of Computer Applications

B.C.A-Semester

Mobile Computing LAB

Credits: 1	Lab: 2 Hours	Tutorials: -
Max Marks: 50	External: 50 Marks	Internal:

Course Objectives:

1. To understand the basic concepts of mobile computing.
2. To learn the basics of mobile telecommunication system.
3. To be familiar with the network layer protocols and Ad-Hoc networks.
4. To know the basis of transport and application layer protocols.
5. To gain knowledge about different mobile platforms and application development.

SYLLABUS

1. Create "hello world" application to display "hello world" in the middle of the screen in the emulator as well as android phone.

2. Create an android app with first activity having edittext and send button. On click of send button, use explicit intent to send the text within edittext to a second activity and displayed within textview.

3. Create a calculator app that performs addition, subtraction, division and multilpication operation on numbers.

4. Create an app that uses radiobutton group which calculates discount on shopping bill amount. Use ediitext to enter bill amount and select one of three radio buttons to determine a discount for 10, 15, or 20 percent.the discount is calculated upon selection of one of the buttons and displayed in a textview control..

5. Create an app that uses radiobutton group of all courses in your college. On selecting one of the buttons, the TIC of that course should be displayed in a textview control at the bottom of the screen..

6. Create an app for displaying Current location in Google Map.

7. Create an app for generating Student Marks List.

8. Create an app for Login.

9. Create an application generating Electricity Bill.

10. Create an app to display 3 button controls vertically aligned. On selecting a button, the color of the screen will change.

Outcomes:

After completion of course, student will be able to:

1. Install and configure Android application development tools.
2. Design and develop user Interfaces for the Android platform.
3. Save state information across important operating system events.
4. Apply Java programming concepts to Android application development.

ALL SEMESTERS
MODEL QUESTION PAPER

Time: 3 Hours **Max. Marks : 75**

SECTION-A

Answer the following Questions: **(5 x 10= 50 Marks)**

1. A.
B. } **UNIT-1**

2. A.
B. } **UNIT-2**

3. A.
B. } **UNIT-3**

4. A.
B. } **UNIT-4**

5. A
B. } **UNIT-5**

SECTION - B

Answer any FIVE of the following Questions **(5 × 3 = 15 Marks)**

6.
7. } **UNIT-1**

8.
9. } **UNIT-2**

10. } **UNIT-3**

11. } **UNIT-4**

12.
13. } **UNIT-5**

SECTION - C

Answer the following Questions **(5 × 2 = 10 Marks)**

14. **UNIT-1**

15. **UNIT-2**

16. **UNIT-3**

17. **UNIT-4**

18. **UNIT-5**