Scheme of Examination

Theory: Exam Marks: 80 IA: 20

The question paper has **TWO Parts.**

4) Part I consists of **12 compulsory** questions out of which **10** questions have to be answered. Each question carries **2 Marks**.

5) Part II consists of **8** questions, out of which **6** questions have to be answered. Each question carries **5 Marks**.

6) Part III consists of **5** questions, out of which **3** questions have to be answered. Each question carries **10 Marks.** Each question further may have sub questions a), b).

Practical: **Computer Lab-1**

IA marks/Record book	: 20
Practical Exam. Marks	: 80
i) Writing Two programs	: 40 marks (20 each)
ii) Execution of One program	: 20 marks
iii) viva-voce	: 20 marks

HEAD
Dept. of Computer Science.
Smt. A.S.M. College

IQAC
CO-ORDINATOR
Smt. Allum Sumangalamma Memorial
College For Women, BELLARY.

PRINCIPAL
Smt. ASM College
For Women, BALLARI.

Wired LANs-Ethernet, Wireless LANs. Connecting LANs, Backbone Networks, and Virtual LANs

References:

1. Behrouza A Forouzan, Data Communication & Networking, Tata McGraw Hill.
2. Andrew S. Tanenbaum, Computer Networks, 5th Ed, Pearson Education
3. William Stallings, Data and Computer Communications, 7th Edition, PHI.
4. http://highered.mheducation.com/sites/0072967757/index.html

Additional Reading

5. Proakin, Digital Communications, Mc Graw Hill.
6. W. Stalling, Wireless Communication and Networks, Pearson.
7. Brijendrasingh, Data Communication and Computer Networks, PHI.
8. Dr. Prasad, Data Communication & Network, Wiley Dreamtech

BSC603CS	Computer Lab-1 (Based On BSC601CS and BSC602CS)	
Practical: 6 Hrs/week		Exam. Marks: 80
		Practical Record : 20

Section A: Web Programming Suggested Assignments

I. Web Programming

1. Write a HTML code to demonstrate various formatting tags, ordered and unordered list, and table using frames suitably.
2. Write HTML/Java scripts to display your CV in navigator, your Institute website, Department Website and Tutorial website for specific subject.
3. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the <span> tag.
4. Create a HTML form containing Textboxes to enter name of student, roll number, course, and grade obtained. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
5. Develop and demonstrate a XHTML file that includes JavaScript script for receiving a number n as input and outputting first n Fibonacci numbers..
6. Write a JavaScript code to compute the sum of n natural numbers.
7. Create a HTML form containing textbox to enter text. Write a JavaScript code block, which checks the contents entered in a form's Text element. If the text entered is in the lower case, convert to upper case. Make use of function to Uppercase ( ).
8. Design an XML document to store information about an Employee viz. Name, EmpId, Job, Department and position. Make up sample data for 3 employees. Create a CSS style sheet and use it to display the document
9. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.

B.Sc. VI Semester Computer Science (Optional)

BSC601CS	Web Programming	
Teaching: 4Hrs/week		Exam. Marks: 60
	Total Teaching Hours : 52	IA Marks : 10

UNIT I 08Hrs

The World Wide Web: Introduction to world wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Applications, Websites – Home Pages: Web Site Development ; How to Builds Web Sites? , Web Content Authoring, Web Graphics Design, Web Programming.

What is a scripting language? Motivation for and applications of scripting, How scripting languages differ from non-scripting languages, Types of scripting languages.

UNIT II 10Hrs

Web Design:

Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML.Overview and features of HTML5.

CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The <span> and <div> tags, Conflict resolution.Overview and features of CSS3.

UNIT III 12Hrs

JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions; Errors in scripts; Examples.

UNIT IV 12Hrs

Java Script and HTML Documents, Dynamic Documents with JavaScript. The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification.

Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

XML: Introduction to XML, Anatomy of an XML, document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL, XML processors, Web services.

UNIT V 10Hrs

PHP : Why PHP and MySQL?, Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors / problems. PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions.

References:

Section B: JAVA Suggested Assignments

Students are encouraged to use Linux-Open Source OS for executing java programs using javac compiler available in Linux.

1. Write a Java program to find sum and average of n integer numbers.
2. Write a Java program to perform matrix multiplication.
3. Write a Java program to find GCD and LCM of two numbers (GCD is calculated using Euclidean Algorithm. LCM is found using factorization method.).
4. Write a Java program to search an element using binary search.
5. Write a Java program to count the frequency of words, characters in the given line of text.
6. Write a Java program that creates an object and initializes its data members using constructor. Use constructor overloading concept.
7. Write a Java Program to implement Wrapper classes and their methods.
8. Write a Java Program to illustrate function overloading concept.
9. Write a Java program implement basic queue operations using class concept.
10. Write a Java program implement basic stack operations using class concept.
11. Write a Java Program to implement inheritance and demonstrate use of method overriding(example: Bank account/Employee)
12. Write a program to demonstrate use of user defined package by importing the package and access the member variable of classes contained in the package..
13. Write a program to demonstrate use of interfaces for two different classes. Interface should also include contants along with function prototypes.
14. Write a java program to implement exception handling using multiple catch statements. Also include code to identify the significance of finally block in handling exceptions.
15. Write a java program to implement the concept of Exception Handling by creating user defined exceptions
16. Illustrate creation of thread by extending Thread class/ implementing runnable interface
17. Write a java program to illustrate thread join.
18. Write a java program to illustrate thread priorities.

BSC502CS	Programming in JAVA	
Teaching: 4Hrs/week		Exam. Marks: 60
	Total Teaching Hours : 52	IA Marks : 10

UNIT I   10Hrs

History of Java, features of Java, JDK Environment, Java Virtual Machine, Java Runtime environment. Identifiers and Keywords, data types, variables, Java coding Conventions, expressions, control structures, decision making statements, Arrays and its methods, Garbage collection & finalize() method.

UNIT II   12Hrs

Java classes, define class with instance variables and methods, object creation, accessing member of class, argument passing, Constructors, Method overloading, static data, static methods, static blocks, this keyword, Nested & Inner classes, Wrapper Classes, String (String Arrays, String Methods, StringBuffer, StringBuilderr)

UNIT III   10Hrs

Inheritance: Super class & subclass, abstract method and classes, method overriding, final keyword, super keyword, down casting and up casting, dynamic method dispatch.
Packages and Interfaces: Importing classes, user defined packages, modifiers &access control (Default, public, private, protected, private protected), implementing interfaces, user defined interfaces, Adapter classes, Exploringjava.lang package: Wrapper classes, Math class. Exploring java.util package: Vector, Scanner, Date, Calendar, StringTokenizer, Random.

UNIT IV   10Hrs

Exception handling: Types of Exceptions, try, catch, finally, throw, throws keywords, creating your own exception, nested try blocks, multiple catch statements, user defined exceptions.
Java Input Output: Java IO package, File, Class Byte/Character Stream, Buffered reader / writer, File reader / writer Print writer File Sequential / Random Serialization and de serialization.

UNIT V   10Hrs

Multithreading:Multithreading Concept,Java thread model, Main thread, creating a thread, creating multiple threads, using is Alive() and join(), thread priorities, synchronization, Inter-thread communication, suspending, resuming and stopping threads, using multithreading

References:
1. Herbert Schildt, The Java 2 : Complete Reference, Fourth edition, TMH,
2. Balaguruswamy, Programming with JAVAA primer, 4th Edition, TATA McGraw-Hill.
3. Cay S Horstmann, Fary Cornell, Core Java 2, Volume – I, Sun Microsystems Press
4. *https://docs.oracle.com/javase/tutorial/*

Additional Reading:

5. Peter Van der Liden, Just Java, Prentice Hall

BSC401CS	COMPUTER LAB. –1 : RDBMS Lab.
Practical: 6 Hrs/week	Exam. Marks: 20
	IA Marks : 10

Suggested Assignments

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario.
    a. Two assignments shall be carried out i.e. consider two different scenarios (eg. bank, college)
2. Write relational algebra queries for a given set of relations.
3. Perform the following:
    a. Viewing all databases, Creating a Database, Viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback)
4. Perform the following:
    a. Altering a Table, Dropping/Truncating/Renaming Tables, Backing up / Restoring a Database.
5. For a given set of relation schemes, create tables and perform the following
    Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (group by and having clause), Queries involving- Date Functions, String Functions , Math Functions
    Join Queries- Inner Join, Outer Join
    Subqueries- With IN clause, With EXISTS clause

6. For a given set of relation tables perform the following
    a. Creating Views (with and without check option), Dropping views, Selecting from a view
7. Illustration of Trigger, procedures and functions.
8. Given the table EMPLOYEE(EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table.

Scheme of Examination

Theory: **Exam Marks: 60   IA: 10**
The question paper has **TWO Parts.**

1) Part I consists of **10 compulsory** questions of **1 Mark each**.
2) Part II consists of **7** questions, out of which **5** questions have to be answered. Each question carries **10Marks.**

Practical:

IA marks	: 10
Practical exam. Marks	: 20
i) Writing Two programs	:10 marks (5 each)
ii) Execution of One program	: 8 marks
iii) viva-voce	: 2 marks

Scheme of Examination

Theory: Exam Marks: 60   IA: 10

The question paper has **TWO Parts.**

1) Part I consists of **10 compulsory** questions of **1 Mark each**.
2) Part II consists of **7** questions, out of which **5** questions have to be answered. Each question carries **10Marks**.

Practical:

IA marks	: 10
Practical exam. Marks	: 20

i) Writing Two programs (including algorithm/flowchart) : 10 marks (5 each)

ii) Execution of One program   : 8 marks

iii) viva-voce   : 2 marks

B.Sc. III Semester Computer Science (Optional)

BSC301CS	Object Oriented Programming With C++	
Teaching: 4Hrs/week		Exam. Marks: 60
	Total Teaching Hours : 52	IA Marks : 10

UNIT I   10Hrs

Overview of C++: Object Oriented Programming concepts, advantages, C++ program development environment, the C++ language standards, C++ as a superset of C.

Classes & Objects: classes, structure & classes, union & classes, inline function, scope resolution operator, static class members: static data member, static member function, passing objects to function, returning objects, object assignment, constructors & destructors, friend function, friend classes.

UNIT II   10Hrs

References & Dynamic Allocation Operators: array of objects, pointers to object, type checking C++ pointers, the this pointer, pointer to derived types, pointer to class members, reference parameter, call by reference and return by reference, passing references to objects, returning reference, C++'s dynamic allocation operators, allocating objects.

UNIT III   12Hrs

Overloading as polymorphism: function & operator overloading, operator overloading restrictions, operator overloading using friend function.

Namespaces: global namespace and namespace std, nested namespaces

Inheritance : base class access control, inheritance & protected members, protected base Class inheritance, inheriting multiple base classes, constructors, destructors & inheritance, execution of constructor & destructor functions, passing parameters to base class constructors, granting access, virtual base classes .

Virtual Functions & Polymorphism: virtual function, pure virtual functions, early vs. late binding.

UNIT IV   10Hrs

Templates and Exception Handling: Exception handling in C++, try, throw, catch sequence, multiple catch blocks, uncaught exceptions, catch-all exception handler, Templates: Reason for templates, compactness and flexibility, function template, class templates.

The C++ I/O System Basics: C++ Streams, the basic stream classes, c++ predefined streams, formatted I/O, file processing.

UNIT V   10Hrs

Overview of the Standard Template Library: The Standard Template Library, Design goals, Header files, STL components, STL Example: vectors, lists, maps, sets. Containers-Vector, Deque, List, Associative Containers, Set, Multiset, Map, Multimap. Iterators: Input iterators, Output iterators, Forward iterators, Backward iterators.

References:

1. Herbert Schildt, C++ The Complete Reference,Tata McGraw Hill Publication.
2. Al Stevens, C++ Programming, Wiley Publications.
3. B. A. Forouzon, R. F. Gilberge, Computer Science: A Structured Approach Using C++,   Thomson Learning.
4. Stroubstrup B., The C++ Programming Language, Addison Wesley.
5. William H. Murray, Chris H. Pappas, Data structures with STL Prentice Hall

KARNATAKA STATE AKKAMAHADEVI WOMEN'S UNIVERSITY, VIJAYAPURA

Syllabus for Bachelor of Science (B.Sc) in Computer Science
(III & IV Semester)

2021-22

National Education Policy - 2020
(NEP-2020)

Model Curriculum Structure

Program: BSc (Basic and Honors)   **Subject: Computer Science For**
1. Computer Science as MAJOR with another Subject as MINOR (Table IIA of Model Curriculum)

2. Computer Science as MAJOR with another Subject also as MAJOR (Table IIIA of Model Curriculum)

3. Computer Science as MINOR with another Subject as MAJOR (As per Table IIA of Model Curriculum)

Sem	Discipline Specific Core Courses (DSC)	Hour / Week		DS Elective Courses	Hours/ Week
		Theory	Lab		
III	21BSDSC3: Design and Analysis of Algorithms	4			
	21BSDSC3P: DAA Lab		4		
IV	21BSDSC4: Database Management Systems	4			
	21BSDSC4P: DBMS Lab		4		

Text Book:
1. Ellis, Horwitz, SartajSahani and Rajashekaran S., "Computer Algorithms", (1999) Galgotia Publications Pvt.,Ltd.

Reference Books:
1. Aho A.V, Hopcroft J.E and Ullman, J.D., "The Design and Analysis of Computer Algorithms", (1976) Addison – Wesley.
2. Sara Baase, Computer Algorithms, "An Introduction to Design and Analysis", Addison Wesley.

Course Title: **Database Management System**	Course code: **21BSDSC4**
Total Contact Hours: 42	Course Credits: 04+02
Formative Assessment Marks: 40	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Identify entities and relationships and draw ER diagram for a given real-world problem.
- Convert an ER diagram to a database schema and deduce it to the desired normal form.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques.

Unit	Description	Hours
1	**Databases and Database Users:** Introduction, An Example, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach, A Brief History of Database Applications, When Not to Use a DBMS.	08
2	**Database System Concepts and Architecture:** Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architectures for DBMSs, Classification of Database Management Systems.	08
3	**Data Modeling Using the Entity–Relationship (ER) Model:** Using High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues.	08
4	**Relational Data Model and Relational Database Constraints:** Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations. **Basic SQL:** SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL.	08

Course Title: **Database Management System Lab**	Course code: **21BSDSC4P**
Total Contact Hours: 42	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

Practicals:

CO: Student would be able to create tables, execute queries programs.

1. Execute a single line query and group functions.
2. Execute DDL Commands.
3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL
7. Create views for a particular table
8. Implement Locks for a particular table.
9. Write a query to understand the concepts for ROLL BACK, COMMIT & CHECK POINTS.
10. Write a query for extracting data from more than one table.

Laboratory Activities:

• **Amazon Alexa:** https://play.google.com/store/apps/details?id=com.amazon.dee.app&hl=en&gl=US • **Google Lens:** https://play.google.com/store/search?q=google+lens&c=apps&hl=en&gl=US • **Image to Text to Speech ML OCR:** https://play.google.com/store/apps/details?id=com.mlscanner.image.text.speech&hl=en_IN&gl=US • **Google Pay:** https://play.google.com/store/apps/details?id=com.google.android.apps.nbu.paisa.user&hl=en_IN&gl=US • **Grammarly:** https://play.google.com/store/search?q=grammarly&c=apps&hl=en_IN&gl= • **Google Map:** https://play.google.com/store/search?q=google+maps&c=apps&hl=en&gl=US • **FaceApp:** https://play.google.com/store/apps/details?id=io.faceapp&hl=en_IN&gl=US • **Socratic:** https://play.google.com/store/apps/details?id=com.google.socratic&hl=en_IN&gl=US • **Google Fit: Activity Tracking:** https://play.google.com/store/apps/details?id=com.google.android.apps.fitness&hl=en_IN&gl=US • **SwiftKey Keyboard:** https://swiftkey-keyboard.en.uptodown.com/android • **E-commerce App:** https://play.google.com/store/apps/details?id=com.jpl.jiomart&hl=en_IN&gl=US	**26 hrs**

Text Books:
1. Wolfgang Ertel, "Introduction to Artificial Intelligence", 2nd Edition, Springer International Publishing 2017.
2. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", 2nd Edition, Pearson Education Limited 2005.

References:
1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_tutorial.pdf
2. Kevin Knight, Elaine Rich, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, July 2017.

Reference Links:
1. Voice Assistant: https://alan.app/blog/voiceassistant-2/
2. Browse with image: https://www.pocket-lint.com/apps/news/google/141075-what-is-google-lens-and-how-does-it-work-and-which-devices-have-it
3. OCR: https://aws.amazon.com/what-is/ocr/
4. Mobile Payment system: https://gocardless.com/en-us/guides/posts/how-do-mobile-payment-systems-work/
5. Grammarly: https://techjury.net/blog/how-to-use-grammarly/#gref

Open Elective

ELECTRONIC COMMERCE

Course Title: **E-Commerce**	Course code: **21CSOE3**	Course Credits: 3 (3L+0T+0P)
Semester: III		Duration of SEE: 03 Hour
Total Contact Hours: 42		SEE: 60 Marks IA: 40 Marks

Course Outcomes (COs):

- Compare how internet and other information technologies support business processes.
- Demonstrate an overall perspective of the importance of application of internet technologies in business administration
- Explain the basic business management concepts.
- Demonstrate the basic technical concepts relating to E-Commerce.
- Identify the security issues, threats and challenges of E-Commerce.

UNIT I   Introduction to E-Commerce and Technology Infrastructure   09 Hrs

Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5

UNIT II   Building an E-Commerce Website, Mobile Site and Apps   10 Hrs

Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App

UNIT III   E-Commerce Security and Payment Systems   09 Hrs

E-Commerce Security Environment – Security threats in E-Commerce – Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Management Policies, Business Procedure and Public Laws
- Payment Systems

UNIT IV   Business Concepts in E-Commerce   09 Hrs

Digital Commerce Marketing and Advertising strategies and tools – Internet Marketing Technologies – Social Marketing – Mobile Marketing – Location based Marketing – Ethical, Social, Political Issues in E-Commerce

UNIT V   Project Case Study   05 Hrs

Case Study: Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart

Course Title: **C Programming**	Course code: **21CSOE4**	Course Credits: 3 (3L+0T+0P)
Semester: IV		Duration of SEE: 03 Hour
Total Contact Hours: 42		SEE: 60 Marks IA: 40 Marks

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Confidently operate Desktop Computers to carry out computational tasks
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C.
- Write programs that perform operations on arrays.

UNIT I   **10 Hrs.**

Introduction to C Programming: Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.
C Programming Basic Concepts: C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants.

UNIT II   **08 Hrs.**

Input and output with C: Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions.

UNIT III   **08 Hrs.**

C Operators & Expressions: Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion.

UNIT IV   **08 Hrs.**

Control Structures: Decision making Statements - Simple if, if_else, nested if_else, else_if ladder, Switch Case, goto, break & continue statements; Looping Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.

UNIT V   **08 Hrs.**

Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and

Department of Higher Education

National Education Policy - 2020
(NEP-2020)

Model Curriculum Structures for
Bachelor of Science (Basic and Honours) Programmes with
Computer Science as Major and Minor Courses,

Syllabus for Bachelor of Science (B.Sc) in

Computer Science

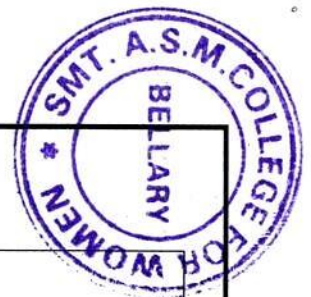and

Open Elective Courses in Computer Science

Submitted to

Karnataka State Higher Education Council
Department of Higher Education
Government of Karnataka
Bengaluru

HEAD
Dept. of Computer Science,
College for Women,
Smt. A.S.M. BALLARI.

IQAC
CO-ORDINATOR
Smt. Allum Sumangalamma Memorial
College For Women, BELLARY.

PRINCIPAL
Smt. ASM College
For Women, BA.

Vocational Courses:

Group-1:	Group-1:
• DTP, CAD and Multimedia	• Health Care Technologies
• Hardware and Server Maintenance	• Digital Marketing
• Web Content Management Systems	• Office Automation
• E-Commerce	• Multimedia Processing
• Web Designing	• Accounting Package

** Discipline Specific Elective Courses:

Group-1:	Group-2:	Group-3:
• IoT	• Information and Network Security	• Data Analytics
• Cyber Law and Cyber Security	• Data Compression	• Storage Area Networks
• Web Programming - PHP and MySQL	• Discrete Structures	• Pattern Recognition
• Clouds, Grids, and Clusters	• Opensource Programming	• Digital Image Processing
• Software Testing	• Multimedia Computing	• Parallel Programming
	• Big Data	• Digital Signal Processing

Control Structures: Decision making Statements - *Simple if, if_else, nested if_else, else_if ladder, Switch-case, goto, break & continue* statements; Looping Statements - Entry controlled and Exit controlled statements, *while, do-while, for* loops, Nested loops.	
Unit - 4	
Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. **Strings:** Declaring & Initializing string variables; String handling functions - *strlen, strcmp, strcpy and strcat;* Character handling functions - *toascii, toupper, tolower, isalpha, isnumeric* etc. **Pointers in C:** Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers;	12
Unit - 5	
User Defined Functions: Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type. **User defined data types:** Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.	10

Text Books

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
2. E. Balgurusamy: Programming in ANSI C (TMH)

References

1. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
2. V. Rajaraman: Programming in C (PHI – EEE)
3. S. ByronGottfried: Programming with C (TMH)
4. Kernighan & Ritche: The C Programming Language (PHI)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)

Semester: II

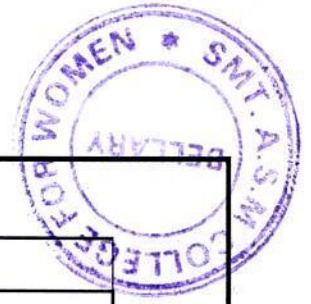|	
Course Title: Data Structures using C	Course code: **21BSDSC2**
Total Contact Hours: 42	Course Credits: 04 +02
Formative Assessment Marks: 40	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 60	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting and searching

Course Content

Content	Hours
Unit - 1	
Introduction to data structures: Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures. Algorithm Specification, Performance Analysis, Performance Measurement Recursion: Definition; Types of recursions; Recursion Technique Examples - Fibonacci numbers, GCD, Binomial coefficient ^nC_r, Towers of Hanoi; Comparison between iterative and recursive functions.	10
Unit - 2	
Arrays: Basic Concepts – Definition, Declaration, Initialisation, Operations on arrays; Types of arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory; Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Selection sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching; Multidimensional arrays; Representation of multidimensional arrays; Sparse matrices.	10
Unit - 3	
Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - *malloc, calloc, realloc* and *free*. Linked list: Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly liked list, Header liked list, Circular linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation; Garbage collection,	12

Course Title: Data Structures Lab	Course code: **21BSDSC2P**
Total Contact Hours: 42	Course Credits: 02
Formative Assessment Marks: 25	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 25	

Programming Lab

Part A:

1. Write a C Program to find GCD using recursive function
2. Write a C Program to display Pascal Triangle using binomial function
3. Write a C Program to generate n Fibonacci numbers using recursive function.
4. Write a C Program to implement Towers of Hanoi.
5. Write a C Program to implement dynamic array, find smallest and largest element of the array.
6. Write a C Program to create two files to store even and odd numbers.
7. Write a C Program to create a file to store student records.
8. Write a C Program to read the names of cities and arrange them alphabetically.
9. Write a C Program to sort the given list using selection sort technique.
10. Write a C Program to sort the given list using bubble sort technique.

Part B:

1. Write a C Program to sort the given list using insertion sort technique.
2. Write a C Program to sort the given list using quick sort technique.
3. Write a C Program to sort the given list using merge sort technique.
4. Write a C Program to search an element using linear search technique.
5. Write a C Program to search an element using recursive binary search technique.
6. Write a C Program to implement Stack.
7. Write a C Program to convert an infix expression to postfix.
8. Write a C Program to implement simple queue.
9. Write a C Program to implement linear linked list.
10. Write a C Program to display traversal of a tree.

Skill Enhancement Course for B.Sc and other courses

Course Title: **Digital Fluency**	Course code: **21SEC1**	Course Credits: 2
Total Contact Hours: 13 hours of theory and 26 hours of practical		Duration of ESA: 01 Hour
Formative Assessment Marks: **20 marks**		Summative Assessment Marks: 30 marks

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- To perform and get knowledge about applications, virtual learning and internet fundamentals.
- Develop holistically by learning essential skills such as effective communication, problem-solving, design thinking, and teamwork.

Course Content:

Content	Hours
Unit – 1	
Fundamentals of computer and Operating System: **Fundamentals of computer:** An Overview of Computer, Functional Components of a computer (Working of each unit), Evolution and Generations of Computers, Classification of Computers, Applications of Computers. **Operating System:** Operating Systems, types of operating systems, major functions of the operating systems, types of user interface, examples of operating systems: MS-DOS, Windows, Mac OS, Linux, Solaris, Android.	05
Unit – 2	
Office Automation Tools, ICT and Security Aspects: **Office automation tools and ICT:** word processor, power point, and spread sheet, creating an email-ID, e-mail reading, saving, printing, forwarding and deleting the mails, checking the mails, viewing and running file attachments, addressing with cc and bcc, Google forms, working with Google Meet and Zoom Meet. Introduction to e-learning platforms such as Swayam and MOOC. **Security Aspects:** Threats and Prevention, Malware - virus, Worms, Ransomware, Trojan, Spyware, adware, key loggers, Modes of Malware distribution, Antivirus, HTTP vs HTTPS, Firewall, Cookies, Hackers and Crackers.	05
Unit – 3	
E-Commence, E- payment methods and Societal impacts: **E-Commence:** Basic Web Commerce Concept, The E-Commerce Environment, Electro Marketplace Technologies, B2B, B2C and C2C. **E- payment methods:** Cash Payment System, Credit Payment System, Types of Electronic Payment Systems: Credit Card • Debit Card • Smart Card • E-Money • Electronic Fund Transfer (EFT). **Societal impacts:** Digital Foot prints, Digital Society and Netizen, Data Protection, E-waste, Impact on Health.	05

Course Title: **Artificial Intelligence**	Course code: **21SEC2**	Course Credits: 2
Total Contact Hours: 13 hours of theory and 26 hours of practical		Duration of ESA: 01 Hour
Formative Assessment Marks: **20 marks**		Summative Assessment Marks: 30 marks

Course Outcomes (COs):

At the end of the course, students will be able to:

- Appraise the theory of Artificial intelligence and list the significance of AI.
- Discuss the various components that are involved in solving an AI problem.
- Illustrate the working of AI Algorithms in the given contrast.
- Analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.
- Apply the AI concepts to build an expert system to solve the real-world problems.

Course Content

Unit - 1	
Overview of AI: Definition of Artificial Intelligence, Philosophy of AI, Goals of AI, Elements of AI system, Programming a computer without and with AI, AI Techniques, History of AI. **Intelligent Systems:** Definition and understanding of Intelligence, Types of Intelligence, Human Intelligence vs Machine Intelligence.	05
Unit – 2	
AI Applications: Virtual assistance, Travel and Navigation, Education and Healthcare, Optical character recognition, E-commerce and mobile payment systems, Image based search and photo editing. **AI Examples in daily life:** Installation of AI apps and instructions to use AI apps.	05
Unit – 3	
Robotics: Introduction to Robotics, Difference in Robot System and Other AI Program, Components of a Robot.	03

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5. Grammarly: https://techjury.net/blog/how-to-use-grammarly/#gref
6. Travel & Navigation: https://blog.google/products/maps/google-maps-101-ai-power-new-features-io-2021/
7. AI in photo editing: https://digital-photography-school.com/artificial-intelligence-changed-photo-editing/
8. AI in education: https://www.makeuseof.com/what-is-google-socratic-how-does-it-work/
9. AI in health and fitness: https://cubettech.com/resources/blog/implementing-machine- learning-and-ai-in-health-and-fitness/
10. E-commerce and online shopping: https://medium.com/@nyxonedigital/importance- of-e-commerce-and-online-shopping-and-why-to-sell-online-5a3fd8e6f416

Text Books

1. V. Rajaraman: Computer Fundamentals, 6th Edition, Prentice Hall India Learning Private Limited, 2014.
2. John Walkenbach, Herb Tyson, Faithe Wempen, cary N. Prague, Michael R. groh, Peter G. Aitken, and Lisa a. Bucki : Microsoft Office 2007 Bible, Wiley India pvt.Ltd.,2007.
3. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals 6th Edition, BPB Publication,2004.

References

1. Alexis Leon, Mathews Leon, and Leena Leon: Introduction to Information Technology, 2nd Edition, Vijay Nicole Imprints Pvt. Ltd., 2009.
2. Shelly Cashman: Discovering the Internet: Complete, 4th Edition - Course Technology, CENGAGE Learning Custom Publishing, 2012.
3. Etc-end the Clutter: Computer & Internet Basics Step-by-Step, Infinity Publishing, 2004.
4. R. Gabriel Gurley: A Conceptual Guide to OpenOffice.org 3, Create Space Independent Publishing Platform, 2008.

Text Books:

1. V. Rajaraman, Neeharika Adabala: Fundamentals of Computers, 6th Edition, PHI Learning Private limited, 2015.

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1. P.B. Kotur: Computer Concepts and C Programming, 23rd edition, Sapna Book House, March 2013.
2. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals, 6th Edition, BPB Publication, 2010.
3. Anita Goel: Computer Fundamentals, Pearson Education India, 2010.
4. Reema Thareja: Fundamentals of Computers, Oxford University Press, 2019.