Course: Major
Advanced C Programming Techniques

Semester: II	Credits: 2	Subject Code: BSMAJCS223120	Lectures: 30

Course Outcomes:

At the end of this course, the learner will be able to:
- CO1 - Write readable C programs with arrays, string for storing the data to be processed
- CO2 - Define and use of pointers with simple applications.
- CO3 - Describe and differentiate between structure and unions to write simple programs.
- CO4 - Understand the concept of file and C processor directives

Unit 1: Secondary Data types Concepts	15

- Arrays-Array declaration, initialization, Types – one, two and multidimensional Array Operations – declaration, initialization, accessing array elements, Memory representation of two-dimensional array (row and column major),Array applications – Finding maximum and minimum, counting occurrences,Linear search, passing arrays to function, Sorting an array (Simple exchange sort, bubble sort), Merging two sorted arrays, Matrix operations (trace of matrix, addition transpose, multiplication, symmetric, upper/ lower triangular matrix)
- Pointers-Pointer declaration, initialization, Dereferencing pointers, Pointer to pointer, Pointer arithmetic, Arrays and pointers, Functions, and pointers-passing pointers to functions(call by reference), function returning pointers, Dynamic memory allocation
- Strings-Declaration and initialization. Format specifiers, Standard library functions, Strings and pointers, Array of strings, Command line arguments, Assignment: Based on chapter 1 and chapter 3
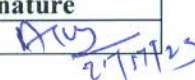
Unit 2: Structure and Union, File Handling	15

- Structures and Unions- Creating structures, accessing structure members (dot Operator), Structure initialization, Array of structures, passing structures to functions,Nested structures,Pointers and structures, Unions, Difference between structures and unions, to implement function using structure, pointer and structure
- File Handling- Introduction to Streams, Types of Files, Operations on files Standard library input/output functions, Random access to files.
- C Preprocessor-Format of Preprocessor directive, File Inclusion directive Macro substitution, nested macro, argumented macro, Macros versus functions
- Assignment: Based on chapter 5 and chapter 6
- Mini Project based on above concept

Recommended Text Books:

- B. Gottfried, 3rd edition, Schaum's outline Series, *Programming with C*,Tata McGraw Hill,2018
- E.Balagurusamy, *Programming in ANSI C*,7th Edition, McGraw Hill,2012

Board of Studies	Department	Name	Signature
Chairperson (HoD)	B.Sc(Comp. Sci.)	Ashwini Kulkarni	

Reference Books:

- Ajay Mittal, Programming in C, *A Practical Approach*, Pearson, 2010
- Behrouz A. Forouzan, Richard F, *A Structured Programming Approach Using C*, Gilberg, Cengage Learning India, 2007

Websites:

- https://www.learn-c.org/
- https://www.cprogramming.com/

Board of Studies	Name	Signature
Chairperson (HoD)	Mrs. Ashwini Kulkarni	*Avy 25/5/23*
Faculty	Mrs. Swati Pulate	*25/5/23*
Faculty	Mrs. Smita Borkar	*10/7/23*
Faculty	Mrs. Shubhangi Jagtap	*Shubhangi 25/5/23*
Faculty	Mrs. Alka Kalhapure	*Alka 25/5/23*
Subject Expert (Outside SPPU)	Dr. Aniket Nagane	*25/07/23*
Subject Expert (Outside SPPU)	Dr. Manisha Divate	*Divate 28/05*
VC Nominee (SPPU)	Dr. Reena Bharathi	*25/5/23*
Industry Expert	Ms. Anjali Ingole	*25/5/23*
Alumni	Ms. Pooja Pande	*25-5-23*

Board of Studies	Department	Name	Signature
Chairperson (HoD)	B.Sc(Comp. Sci.)	Ashwini Kulkarni	*Avy 25/7/23*