ES-105A	Programming for Problem Solving						
L	**T**	**P**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**-**	**-**	**3**	**75**	**25**	**100**	**3h**
Purpose	**To familiarize the students with the basics of Computer System and C Programming**						
Course Outcomes							
CO 1	**Describe the overview of Computer System and Levels of Programming Languages.**						
CO 2	**Learn to translate the algorithms to programs (in C language).**						
CO 3	**To implement various operators in C**						
CO 4	**Learn description and applications of conditional branching, iteration and recursion.**						
CO 5	**To use arrays, pointers and structures to formulate algorithms and programs.**						
CO 6	**Implementation of operations on files**						

UNIT – I

Overview of Computers: Block diagram and its description, Number systems, Arithmetic of number systems, Computer Hardware: Printers, Keyboard and Mouse, Storage Devices.

Introduction to programming language: Different levels of PL: High Level language, Assembly language, Machine language; Introduction to Compiler, Interpreter, Debugger, Linker, Loader, Assembler.

Problem Analysis: Problem solving techniques, Algorithms and Flowchart representation.

UNIT – II

Overview of C: Elements of C, Data types; Storage classes in C; Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators, precedence & associativity of operators.

Input/output: Unformatted & formatted I/O function in C.

Control statements: if statement, switch statement; Repetition: for, while, and do-while loop; break, continue, goto statements.

UNIT – III

Arrays: Definition, types, initialization, processing an array, String handling.

Functions: Definition, prototype, parameters passing techniques, recursion, built-in functions, passing arrays to functions, returning arrays from functions.

UNIT – IV

Pointers: Declaration, operations on pointers, pointers and arrays, dynamic memory allocation, pointers and functions, pointers and strings.

Structure & Union: Definition, processing, passing structures to functions, use of union.

Data files: Opening and closing a file, I/O operations on files.

Suggested Books:

1. Brian W. Kernighan Dennis Ritchie, "C Programming Language" Pearson Education India.
2. SubrataSaha,Subhodip Mukherjee:Basic Computation & Programming with 'C'- Cambridge University Press.
3. Ajay Mittal, "Programming in C - A Practical Approach", Pearson.
4. E Balagurusamy :Programming in ANSI C,TMH Education.
5. PradipDey and ManasGhose, "Computer Fundamental and Programming in C", Oxford Pub.
6. ForouzanBehrouz, "Computer Science: A Structured Programming Approach Using C", Cengage Learning.
7. Ashok Kamthane, "Programming in C, 3e", Pearson Education India..

8. YashwantKanetker, “Let us C”, BPB Publications.
9. A K Sharma, “ Fundamentals of Computers & Progof India Learning.

Note: The paper setter will set the paper as per the question paper templates provided.

LESSON PLAN

Name: Pooja Sharma

Discipline: Information Technology

Semester: 2nd

Subject: programming for problem solving (ES-105A)

Lesson Plan Duration: 15 weeks (from January, 2019 to April, 2019)

Work Load: Lectures-03

Week	Theory	
	Lecture Day	**Topic**
1st	1st	Overview of Computers: Block diagram and its description
	2nd	Number systems, Arithmetic of Number Systems
	3rd	-do-
2nd	4th	-do-
	5th	-do-
	6th	Computer Hardware: I/O Devices
3rd	7th	-do-
	8th	Memory :Main Memory & Secondary Memory
	9th	-do-
4th	10th	Different levels of PL: High Level language, Assembly language, Machine language
	11th	Introduction to Compiler, Interpreter, Debugger, Linker, Loader, Assembler.
	12th	Algorithm & related examples
5th	13th	Flowcharts & Related Examples
	14th	Revision of Important Concepts of 1st Unit
	15th	Introduction to Computer Programming Language :C Elements of C, Data types
6th	16th	Operators in C : Their precedence & associatively of operators
	17th	Input & Output Statements in C, Structure of C- Program
	18th	Programming examples
7th	19th	Introduction to Conditional Programming In C, Various Conditional Constructs in C
	20th	Programming Examples of Conditional Constructs
	21st	-do-
8th	22nd	Introduction to Loops in C: Various Loop Structures like While, Do-While, For
	23rd	Programming Examples of Loops

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	24th	-do-
9th	25th	Break , Continue, goto statements in C & Their practical application
	26th	Revision of Important Concepts of 2nd Unit
	27th	Introduction to Arrays in C (1-D,2-D & Multidimensional)
10th	28th	Processing of Arrays with programming examples
	29th	String Handling in C, String Library Functions
	30th	Programming Examples of String
11th	31st	Functions in C, Definition, Prototype of Functions
	32nd	Parameter Passing Techniques (Call By Value, Call By Reference)
	33rd	Recursive Functions ,Passing Array to a Function
12th	34th	Programming Examples of Functions & Related Concepts
	35th	Revision of Important Concepts of 3rd Unit
	36th	Pointers in C : Declaration, Initialization & Their Usage
13th	37th	Pointers & Functions using programming examples
	38th	Pointers & Strings using programming examples
	39th	Structures in C
14th	40th	Union in C
	41st	Union in C
	42nd	File Handling in C
15th	43rd	Programming examples
	44th	Revision of important concepts of 4th Unit
	45th	Revision Test

Lesson Plan (Lab)

Name of the Faculty : **Pooja Sharma**

Discipline : **Programming for problem solving**

Semester : **2nd**

Subject : **Computer Programming Lab (ES-107LA)**

Lesson plan : **15 Weeks (From January, 2018 to April, 2018)**

Lecture per Week (in Hours): **Lectures-02**

Week	Practical	
	Practical Day	Topic
1st	1.	Introduction to C-Language & Basics of Programming Write a program to find the sum of individual digits of a positive integer.
2nd	2.	Introduction to Loops Write a program to generate the first n terms of the Fibonacci sequence. Write a program to generate all the prime numbers between 1 and n, where n is the input value given by the user.
3rd	3.	Introduction to Conditional Programming Write a program to find the roots of a quadratic equation.
4th	4.	Introduction to Functions in C Write a function to generate Pascal's triangle. Write a function to construct a pyramid of numbers.
5th	5.	Write programs that use both recursive and non-recursive functions for the following a. To find the factorial of a given integer. b. To find the GCD (greatest common divisor) of two given integers.
6th	6.	Introduction to Arrays (1-D,2-D & Multidimensional) Write a program for addition of Two Matrices Write a program for calculating transpose of a matrix. Write a program for Matrix multiplication by checking compatibility Write a C functions to find both the largest and smallest number of an array of integers.
7th	7.	Strings & Its Operations:- Write a function that uses functions to perform the count the lines, words and characters in a given text.
8th	8.	Write a program to read a string and write it in reverse order Write a program to concatenate two strings

		Write a program to check that the input string is a palindrome or not.
9th	9.	Pointers, Structure & Union:- Write a program to print the element of array using pointers Write a program to implement call by reference
10th	10.	Write a program to explores the use of structures, union and other user
		defined variables
11th	11.	File Handling:- Write a program which copies one file to another. Write a program to reverse the first n characters in a file.
12th	12.	Revision
13th	13.	Revision
14th	14.	Viva
15th	15.	Viva

Tutorial sheet-1

Q1. Explain the block diagram of a computer System.
Q2.What is an assembly language? What are the advantages over machine language?
Q3. Explain the flowchart with the help of an example.
Q4. Find the decimal equivalent of the following numbers:

(i) 111.01_2
(ii) 247.65_8
(iii) 1101.001_2
(iv) $A2A.D4_{16}$

Tutorial sheet-2

Q1. Explain The terms: (1) Compiler (2) Debugger (3) Linker (4) Loader
Q2.Write a program in C to find whether the character entered is vowel or not.
Q3. What is the difference between while and do while loop?
Q4.What do you mean by function? Explain various benefits of using functions.

Tutorial sheet-3

Q1. What are identifiers? Write rules for identifiers. Which of the following are valid identifiers?

(i) Record 1
(ii) Name and address
(iii) File
(iv) 123-45
(v) File 2

Q2.What are the actual and formal parameter s? Explain parameter passing.
Q3. What is recursion? Explain with example.
Q4.Write a program in C to print Fibonacci series.

Tutorial sheet-4

Q1 How arrays are declared and used in C?
Q2.What is an expression? What are different types of operators in C?
Q3. Write a program in C to concatenate two strings and create a new string.
Q4.Describe the file input and output in C Language..

Sample paper
Programming for problem solving(ES-105A)

UNIT-1

Q1.What are the basic components of the CPU of a computer system? Describe the role of each component in the functioning of a computer system.

Q2. What do you understand by unary, Binary and ternary operator in C Explain with example?

UNIT-2

Q3.What are flowchart? Draw a flowchart to find the sum of first 10 numbers.

Q4. What is an expression? What are different types of operators in C?

UNIT-3

Q5. What are keywords? Explain library function. Give suitable examples.

Q6. Differentiate between formatted and unformatted input and output in C language.

UNIT -4

Q7. Explain with the help of suitable example the opening and closing of a file.

Q8. Explain any 5 string functions in C