Course Name : Electronics Engineering Group

Course Code : DE/ED/EI/EJ/EN/ET/EV/EX/IC/IE/IS/IU/MU

Semester : Third

Subject Title : Programming in C

Subject Code : 17020

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	--	25@	25

Rationale:

Today's most of the electronically operated devices, integrated circuits, controllers, equipments, gadgets are run by specific drivers/software. To understand design, develop and write drivers, programming knowledge is required.

Traditionally 'C' is the most popular, versatile, simple and commonly used middle level language to write efficient, compact and portable drivers/ software's.

The subject will enable the students to inculcate programming concepts and methodology used to write, debug, compile and execute simple 'C' programs using different data types, structures and functions.

Programming knowledge and skill acquired in this course will help in learning higher level courses such as visual programming language, microcontrollers, embedded systems and VLSI. Due to these powerful features C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming so as to develop Operating system softwares. C is still considered as first priority programming language.

This course will lay the basic foundation of programming which will enable students to develop simple to complex programs in the real world.

General Objectives.

Students will able to.

- Learn programming concepts and methodology
- Learn standard, sequential, decision and iterative structures of programming language
- Write, debug, compile and execute the programs
- Write programs for hardware interfacing.
- Design graphics using standard geometrical shapes and graphic functions
- Handle text and binary files for real life applications

Learning Structure:

Applications

Enable to write/develop software/programs such as
- Text editors, device drivers
- Operating system utilities
- Simple to complex academic applications
- GUI based applications
- Data communication between DTE and DCE
- To control specific/customized hardware

Procedure

Coding, compilation, syntax error removal	Debugging, Logical error removal	Execution of Program	Writing user defined functions, compiling it.	Writing interfacing programs to interface hardware, peripherals, drivers	Writing simple programs for data communication between DTE and DCE

Principle

Declaration and initialization of variables and constants	Writing simple formatted input output statements	Using standard 'C structures for decision making, looping	Declaring, defining and using user defined functions and user defined data types	Using library functions and header files	Graphics

Concept

Syntax rules, Semantic rules Logic development	Writing formulas, instructions	Data maintenance Priority of operators	'C' program Concept.	C standard structure of program	Header files concepts

Facts

Character set, Keywords, Tokens Identifiers	Variables Operators, constants expressions	Input and Output statements	Decision making and Looping	Basic, derived and user defined data types	ASCII code, Bit, bytes, memory allocation and size of memory

Theory:

Topic and Contents	Hours
Topic 1] Fundamentals of 'C' **Specific Objectives:** ➢ **Realize need of learning 'C'** ➢ **Write standard structure of 'C' program.** ➢ **Declare, initialize and assign values to variables** ➢ **Access memory location and memory allocation** ➢ **Use appropriate operators** ➢ **Form expression and statements** **Contents:** 1.1 History of C, Features of 'C', advantages of 'C', assembler, compiler, interpreter, structure of 'C' program 1.2 Character set, keywords, constants, variables, rules of variables, data type-declarations, initializations, assignments, memory sizes, formatting characters and minimum/maximum values for each data types, type modifiers, type conversion 1.3 Operators (arithmetic, Logical, assignment, relational, increment and decrement, conditional, bit wise, special operators) precedence, expressions, formatted input and output statements.	03
Topic 2] Decision and Loop Control **Specific Objectives:** ➢ **Use appropriate decision structure and loops based on given situation** ➢ **Enter, exit and transfer control to required statements** ➢ **Write structured programs with indentions** **Contents:** 2.1 Decision making and branching: if statement (if, if-else, if-else-if ladder, nested if-else), switch statement. 2.2 Loop Control: What is loop, why to use loops, pre test and post test loops, while, do-while and for loops, nested loops, break and continue statement	03
Topic 3] Arrays and Strings **Specific Objectives:** ➢ **Differentiate between simple and subscripted variables** ➢ **Identify need of arrays** ➢ **Identify situation where array logic is most appropriate.** ➢ **Use string handling.** **Contents:** 3.1 Arrays: Declaration, initialization of one dimensional, two dimensional arrays, size of array, memory allocation of array, accessing array elements using index. Operations such as searching and sorting of array. 3.2 Declaration and initialization of string variables, string handling functions from standard library (strlen (), strcpy (), strcat (), strcmp()).	03

Topic 4] Functions and Structures **Specific Objectives:** ➢ **Write modular programs** ➢ **Write user defined functions** ➢ **Compile and add user defined function in header files** ➢ **Add functions in library using utilities** ➢ **Declare, initialize and use structures i.e. user defined data types** **Contents:** 4.1 Basics of a function, Need of functions, How function works, Function definition, internal and external variables, scope and lifetime of variables, function call, passing arguments to functions (call by value, call by reference), return values, storage classes. category of function , Library functions 4.2 Structures: Defining structure, declaring and accessing structure members, initialization of structure, arrays of structure.	03
Topic 5] Graphics and File Handling **Specific Objectives:** ➢ **Write programs using graphic and text functions** ➢ **Identify need of file handling** ➢ **Work with files** **Contents:** 5.1 Graphics introduction, Initialization of graphics, using fonts, patterns, colours, styles, filling. Basic graphic functions 5.2 Why to use file, file types-text and binary, file handling-sequential and random, file operations- read, write, open, close, append, basic file functions	04
Total	**16**

Skills to be developed:
Intellectual skills:

1. Use of programming language constructs in program implementation.
2. Apply different logics to solve given problem.
3. write program using different implementations for the same problem
4. Study different types of errors as syntax semantic, fatal, linker & logical
5. Debugging of programs
6. Understanding different steps to develop program such as
    - Problem definition
    - Analysis
    - Design of logic
    - Coding
    - Testing
    - Maintenance (Modifications, error corrections, making changes etc.)

Motor Skills:

1. Proper handling of Computer System**.**
2. Typing skill

List of practical: (Any ten form following)
Experiment No.1 (Any one)

- Display hexadecimal, decimal, octal format of the entered numbers.
- Accept kilometer and convert it into meter, cm, inch and feet.
- Accept four digit number and find sum of individual digits and print it in reverse order
- To find the roots of quadratic equation

Experiment No.2

- Demonstrate all possible formatting specifiers with there width and alignment options.
- Prepare salary statement and display on screen with proper formatting and alignments (Input name, basic salary, calculate various allowances such as DA, HRA, Conveyance and deductions such as income tax, Professional tax, provident fund and find net salary.

Experiment No.3 (Any one)

- Find greatest/ smallest of 3 numbers. (use if, if else, nested if)
- Display pass class, second-class, first class, distinction according to the marks entered. (use switch, if else-if else ladder)

Experiment No.4 (Any one)

- Display menu 1. Addition 2. Subtraction 3. Multiplication 4. Division and execute it using switch case.
- Write a program to calculate and print telephone bill or electricity bill.

Experiment No.5 (Any one)

- Display our College name twenty times on screen.
- Display all even numbers from 1-100.
- Perform addition of 1-100 numbers.
- Print ASCII tables of alphabets use continue statements.
- Print prime numbers from 1 to 100 use break statements

Experiment No.6 (Any one)

- Find smallest / largest number from array elements.
- Sort array elements in ascending / descending order.

Experiment No.7 (Any one)

- Enter elements for 3X3 matrix and display them.
- Calculate addition / subtraction of 2 dimensional matrix.
- Calculate multiplication of 2 dimensional matrix.

Experiment No.8 (Any one)

- Demonstrate output of standard library functions Strlen (), strcpy (), strcat (), strcmp ().
- Accept a string and arrange individual characters alphabetical order.
- Accept ten names of students and arrange them in alphabetical order

Experiment No.9 (Any one)

- Calculate area of circle using function.
- Calculate factorial of any given number using recursion.

Experiment No.10 (Any one)

- Demonstrate call by reference, call by value
- Maintain and manipulate student data using structure.

Experiment No.11 (Any one)

- Draw concentric circle with different radius and colors and give appropriate heading using fonts and styles
- Draw different geometric shapes and fill it with different fill patterns and give appropriate heading using fonts and styles

Experiment No.12 (Any one)

- Write a program to write and read text file
- Write a program to read numbers from file and print them in another file in ascending order.

Learning Recourses:

1. **Books:**

Sr. No.	Author	Name of the Book	Publisher
1	Balgurusamy	Programming in 'C'	Tata Mc-Graw Hill
2	Ashok N Kamthane	Programming in 'C'	Pearson
3	Kanetkar	Let's 'C'	BPB
4	Herbert Shildt	Complete reference C	Tata Mc-Graw Hill
5	Arpita Gopal	Magnifying 'C'	PHI Publications

2. **Websites:**
   - http://cplus.about.com/od/beginnerctutoriali/a/blctut.htm
   - http://computer.howstuffworks.com/c.htm
   - http://www.indiastudycenter.com/studyguides/sc/objtest/default.asp