**Course Title: C Programming (4 Cr.)**

**Course Code: CACS151**

**Year/Semester: I/II**

**Class Load: 8 Hrs. / Week (Theory: 4 Hrs, Tutorial: 1 Hr., Practical: 3 Hrs)**

**Course Description**

This course includes both theoretical as well as practical concept of programming. Practical skill of programming are provided using C language which includes basic concept of C, operators and expressions, basic input/output function, control structures, array & string. Function, pointer, structure and union, file handling and graphics in C.

**Course Objectives**

The general objectives of this course are to provide fundamental concepts of programming language, programming technique and program development using C programming language.

**Course Content**

|  |  |
| --- | --- |
| **Specific Objectives** | **Content** |
| * Definition of programming languages and its type (Machine Language, Assembly language, High Level Language, Fourth Generation Language, Fifth Generation Language) * Language Processor(assembler, compiler, interpreter) * Define Program Error(syntax error, semantics error, runtime error, Linker error) * Explain features of good program. * Different Programming Paradigm( Imperative, Declarative, functional, Object oriented, multi-paradigm) * Software development Model(Waterfall, RAD, prototype, Spiral, increment) * SDLC and System Design Tool(DFD, Flowchart, algorithms, decision Table and decision tree, ERD, pseudocode ) | **Unit 1 Programming Language 10 Hrs.**  Introduction to Programming Language, Types of Programming Language, Language Processor, Program Errors, Features of Good Program, Different Programming Paradigm, Software Development Model, Program Development Life Cycle, System Design Tools. |
| * Explain Top down and bottom up approaches. * Define Cohesion and Coupling and its types * Structure vs unstructured * Deterministic and Non-deterministic * Concept and application of Iteration and recursive * Concept of software modular designing and Programming | **Unit 2 Programming Technique 5 Hrs.**  Introduction to Programming Technique, Top down & Bottom up Approach, Cohesion and Coupling, Structured Programming, Deterministic and Non-deterministic Technique, Iterative and Recursive Logic, Modular Designing & Programming. |
| * Introduction of C programming Language * Explain the compiling process of C language * Write down Advantages and disadvantages using procedure oriented language like C. * What is preprocessor? why header file is required explain with example * Different between library and user define function. * Why comments is placed in C programming? Explain different way of placing comment. * What is C token? Explain different types of C token. * Explain different datatypes with its potential value to store. * What is escape sequence? explain with example | **Unit 3 Basic Concept of C 5 Hrs.**  Introduction, History, Features, Advantages and Disadvantages, Structure of C program, Compiling Process, C Preprocessor and Header Files, Library Function, Character Set, Comments, Tokens and its types. Data types, Escape Sequences, Preprocessors Directives. |
| * What is Operator? Explain different types operator with example? * How does C language process the expression and evaluated the statement? Explain with example. * Why Type casting in Expression required in C programming? | **Unit 4 Operators and Expressions 3 Hrs.**  Arithmetic Operator, Relational Operator, Logical Operator, Assignment Operator, Increment/decrement Operator, Conditional Operator, Bitwise Operator, Comma Operator, Sizeof Operator, Operator . Precedence and Associativity, Expressions and its Evaluation Type Casting in Expression, Program Statement. |
| * Explain the structure and usage the different types of I/O handling formatted/unformatted function with example. | **Unit 5 Input and Output 3 Hrs.**  Input/Output Operation, Formatted I/O (scanf, printf, Unformatted I/O (getch-putch, getehe, getchar-putchar and gets-puts) |
| * Explain different types of control structure and its use in programming language. * Explain the difference between if and switch statement. * What is nested loop? Solve different types problem using nested loop. * Explain the do..While/for/while loop with example. * What is loop? Solve different types of problem using loop. * Explain concept of jumping statement with suitable example. | **Unit 6 Control Structure 6 Hrs.**  Introduction, Type of Control Structure (Branching:if, if else, if elseif and switch case, Looping: while, do while and for and Jumping: goto, break and continue), Nested Control Structure. |
| * What is an array? Solve different types of problems using array. * How you initialization one/two dimension an array and solve the problem of single and multi-dimension of array. * Solve the sorting related problem using bubble/selection sort. * What is the requirement of string manipulation function? Explain various types of string handling function. * Implement search particular value in array along with position and no of presence in array. | **Unit 7 Array 6 Hrs.**  Introduction, Declaration, Initialization, One Dimensional Array, Multi-Dimensional Array, Sorting (Bubble, Selection), Searching Sequential), String Handling. |
| * Concept of requirement of user defined function and their usage along with parameters. * Recursion vs loop and implementation of recursive function. * How we pass the array to the function in terms of integer and string. * Implementation of call by value and call by reference. * Concept of storage class and its types. * Implementation of macros in the function. | **Unit 8 User Defined Function 5 Hrs.**  Introduction, Components, Function Parameters, Library Function vs. Users Defined Function, Different Forms of Function, Recursion, Passing Array to Function, Passing String to Function, Accessing a function (Call By Value & Call By Reference), Macros, Storage Class. |
| * Concept of proper use of indirection and address operator. * Use of pointer in array, structure and function. * Why DMA is essential in C programming. Solve DMA related problem using the functions caloc ,malloc, alloc. | **Unit 9 Pointer 6 Hrs.**  Introduction, The Address(&) and Indirection(\*) Operators, Declaration & Initialization, Pointer to Pointer, Pointer Expressions, Pointer Arithmetic, Passing Pointer to a Function, Pointer and Array, Array of Pointer, Pointer and String, Dynamic Memory Allocation. |
| * Concept of structure including initialization, nested and array of structure. * How we pass structure in the array. * Solve the problems with use of structure along with the pointer. * Different types of structure vs union. | **Unit 10Structure 5 Hrs.**  Introduction, Declaration, Initialization, Nested Structure, Array of structure, Array within Structure, Passing Structure & Array of Structure to function, Structure & Pointer, Bit Fields, Union and Its Importance, Structure vs. Union |
| * Concept of data file in C programing. * Use of various function of creating, opening, writing and close of file. * Insertion, update and deletion of data in file. * Solve file related problems | **Unit 11Data File Handling 4 Hrs.**  Introduction, Types of File, Opening & Closing Data File, Read & Write Function, Writing & Reading Data To and From Data File, Updating Data File. Random Accessing Files, Printing a File. |
| * Concept of graphics in c Programming which include different graphical mode and graphic related function to draw line, polygon, Circle, rectangle, text, colors. | **Unit 12Introduction to Graphics 2 Hrs.**  Initialization, Graphical Mode, Graphical Functions. |

**Laboratory Works**

Laboratory works should be done covering all the topics-listed above and a small project work should be carried out using the concept learnt in this exercise only. Project should be assigned on individual basis.

**Teaching Methods**

The general teaching pedagogy includes class lectures, group discussions, case studies, guest lectures, research work, project work, assignments (theoretical and practical), and examinations (written and verbal), depending upon the nature of the topics. The teaching faculty will determine the choice of teaching pedagogy as per the need of the topics.

**Evaluation**

|  |
| --- |
| Internal Assessment Format [FM = 20] – Subject Teacher |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Term Examination | | Assignment | Attendance | Total | | First | Final | | 5 | 5 | 5 | 5 | 20 | |
| Practical Assessment Format [FM = 20] – External Examiner will be assigned by Dean Office, FOHSS. |
| |  |  |  |  | | --- | --- | --- | --- | | Practical | Viva | Lab Reports | Total | | 10 | 5 | 5 | 20 | |

Note: Assignment may be subject specific case study, seminar paper preparation, report writing, project work, research work, presentation, problem solving etc.

Final Examination Questions Format [FM = 60, Time = 3 Hrs.]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SN** | **Question Type** | **Number of Questions Given** | **Marks per Question** | **Total Marks** |
| 1 | Group – 'A'  Objective Type Questions (Multiple Choice Questions)  Attempt all the questions. | 10 | 1 | 10 x 1 = 10 |
| 2 | Group – 'B'  Short Questions (Attempt any **SIX** questions.) | 7 | 5 | 6 x 5 = 30 |
| 3 | Group – 'C'  Long Questions (Attempt any **TWO** questions.) | 3 | 10 | 2 x 10 = 20 |

**Text Books**

1. Brain W. Kerighan & Dennis Ritchie, *"The C Programming Language",* Second Edition, Prentice Hall, 1988, ISBN: 978-0131103627
2. Byrons S. Gotterfried, *"Programming with C, 3/e, ",* McGraw Hill Education India, 2013, ISBN: 978-0-07-014590-0

**Reference Books**

1. Al Kelley, Ira Pohl, *"A Book on C",* 4th Edition, Pearson Education, 1998, ISBN: 978-0201183993
2. Deitel & Deitel, *"C: How to program", 7th* Edition, Pearson Education, 2012, ISBN: 9780273776840
3. E Balagurusamy, *"Programming in ANSI C, Sixth Edition",* Tata Mc GrawHill, 2012 ISBN: 9781259004612
4. Yeshvant Kanetkar, *"Let us C", 13th* Edition, BPB Publication,2013, ISBN: 978-81­8333-163-0
5. Ramesh Rimal & et. al., *"Computer Science-II, Revised Edition",* Buddha Academic Publishers and Distributors Pvt. Ltd:'Nepal 013

**TRIBHUVAN UNIVERSITY**

**Faculty of Humanities & Social Sciences**

**OFFICE OF THE DEAN**

**Model Question**

Bachelor in Computer Application Full Marks: 60

Course Title: C PROGRAMMING Pass Marks: 24

Code No: CACS151 Time: 3 Hours

Semester: 2nd

Roll no: Name:

Candidates are required to answer the questions in their own words as for as possible.

**Group-“A”**

**Attempt all the questions** [10 X 1=10]

**Circle ( ) the correct answer in the following questions**.

1. What is meaning of below lines?

void sum (int, int);

1. sum is function which takes int arguments
2. sum is a function which takes two int arguments and returns void
3. it will produce compilation error
4. Can't comment
5. Which of the following cannot be checked in a switch-case statement?
6. Character
7. Integer
8. Float
9. enum
10. C variable cannot start with
11. An alphabet
12. A number
13. A special symbol other than underscore
14. both (b) and (c)
15. What is sizeof In ‘C’?
16. Operator
17. Reserve Word
18. Both (A) and (B)
19. Function
20. Which of the following is not logical operator.
21. &
22. &&
23. ||
24. !
25. The single character input/output functions are?
26. scanf( ) and printf( )
27. getchar( ) and printf( )
28. scanf( ) and putchar( )
29. getchar( ) and putchar( )

1. The keyword used to transfer control from a function back to the calling function is
2. switch
3. goto
4. go back
5. Return
6. How will you free the allocated memory?
7. remove(var-name);
8. free(var-name);
9. delete(var-name);
10. dalloc(var-name);
11. What is the output of C statement 7.5 % 3?
12. 1.5
13. 1
14. No output
15. Error
16. The first and second arguments of fopen() are?
17. A character string containing the name of the file & the second argument is the mode.
18. A character string containing the name of the user & the second argument is the mode.
19. A character string containing file pointer & the second argument is the mode.
20. None of above

**TRIBHUVAN UNIVERSITY**

**Faculty of Humanities & Social Sciences**

**OFFICE OF THE DEAN**

**Model Question**

Bachelor in Computer Application Full Marks: 60

Course Title: C PROGRAMMING Pass Marks: 24

Code No: CACS151 Time: 3 Hours

Semester: 2nd

*Candidates are required to answer all the questions in their own words as far as practicable.*

**Group-“B”**

**Attempt any SIX questions. [6 X 5 = 30]**

1. What is loop? Write a C program to display multiplication table from 1 to 10 using nested loop. 1+4.
2. What is recursion function? Write a program to calculate xn using recursive funtion.1+4
3. What is dynamic memory allocation (DMA)? Write a C program to find minimum and maximum number from 10 integer using appropriate DMA function. 1+4
4. Write a C program to draw **circle**, **rectangle** and **line** with the use of graphics functions. 5
5. Write a program to enter id, name and marks of 10 student into file and display those who score more than 60 marks, reading from file called “student.txt”. 5
6. What is operator? Explain different types of operator used in C language. 1+4
7. Explain the term cohesion and coupling in the context of modular programming.5

**Group – “C”**

**Attempt any TWO questions. [2 X 10 = 20]**

1. What do you mean by Software Development Life Cycle? Explain increment model with its advantages and disadvantage. 2+8
2. What is pointer? Write a C programmer to enter **id, name, and address** of 25 students into structure variable called **student** and sort them in ascending order on the basis of name with use of pointer. 2+8
3. What is an array? Write a C program to input 10 numbers into array and sort them in descending order with use of pointer 2+8