SCHOOL OF MATHEMATICAL SCIENCES
Bachelor in Mathematical Sciences (B.Math.Sc.)

Course of Study

Code No.: MSCS 151   *Full Mark*: 75
***Paper*:   Introduction to Programming I**   *Pass Mark*: 30
Nature: Theory + Lab   *Credit*: 3

Course description:
This course covers the concepts of C programming including data types, operators, control statements, arrays, functions, pointers, structures, unions, and data files.

Course objectives:
The main objective of this course is to provide students knowledge of different concepts C programming so that they will be able to develop small to medium size computer programs using C programming language.

Mode of Delivery:
The course will be taught by lecture (48 hrs), and lab work (24 hrs). The students are encouraged to develop computer programs related to the concepts of the C language after completion of each chapter.

Course content:

Unit 1 Programming Preliminaries   3 hrs
> Introduction to Program and Programming Language; Compiler and Interpreter; Algorithm, Flow Chart, and Pseudocode; ASCII; Software Development

Unit 2 C Fundamentals   5 hrs
> Introduction; Basic Structure; Writing a Simple C Program; The C Character Set; Identifiers and Keywords; Data Types; Variables and Constants; Writing Comments; Operators; Expressions and Statements

Unit 3 Data Input and Output   5 hrs
> Preliminaries; Single Character Input – The Getchar Function; Single Character Output – The Putchar Function; Entering Input Data – The Scanf Function; More About Scanf Function; Writing Output Data – The Printf Function; More About Printf Function; The Gets and Puts Functions

Unit 4 Control Statements   9 hrs
> Preliminaries; Branching Statements – If and Switch Statements; Looping Statements – For, While, and Do While Statements; Nested Control Statements; Break and Continue

Unit 5 Functions   5 hrs
> Introduction; Function Prototype; Function Definition; Function Call; Advantages of Using Function; Types of Functions – Library Function and User Defined Function; Recursive Function; Storage Classes; The Preprocessor - #include and #define

Unit 6 Arrays   **4 hrs**

Introduction; Array declaration and Initialization; Searching and sorting; Multidimensional arrays; Strings

Unit 7 Pointers   **5 hrs**

Fundamentals; Pointer Declarations; Passing Pointers to a Functions; Pointers and One-dimensional Arrays; Dynamic Memory Allocation; Operations on Pointers; Pointers and Multi-dimensional Arrays; Arrays of Pointers

Unit 8 Structures and Unions   **7 hrs**

Defining a Structure; Processing a Structure; User Defined Data Types (typedef); Structures and Pointers; Passing Structures to Functions; Self-referential Structures; Unions

Unit 9 Data Files   **5 hrs**

Why Files; Opening and Closing a Data File; Reading and Writing a Data File; Processing a Data File; Unformatted Data Files; Concept of Binary Files

Laboratory Work:

After completing this course, students should have practical knowledge on data types, operators, control statements, arrays, functions, pointers, structures, unions, and data files. Students should be able to develop a small mini project on their interested field.

Recommended Books:
1. Programming with C, Byron S Gottrried
2. A Book on C, Programming in C, Al Kelley and Ira Pohl, Pearson Education

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