DINABANDHU ANDREWS COLLEGE

30 Hour Certificate Course on C-Programming

Offered by the Department of Mathematics

DINABANDHU ANDREWS COLLEGE (C-11955)

P.O. GARIA, KOLKATA 700 084

Soumen Law

Introduction to Computing

Prerequisite: Any undergraduate (UG) students having Mathematics as a subject in 10+2 level.

Contact Hours: 30 Lectures (**One Class: 1 Hour**)

Instructors: Dr. Soumen Shaw and Dr. Tridip Sardar

Mode of Teaching: Offline

Course Fee: **Free of Cost**

Syllabus (4 modules):

Module 1: (Introduction to Computing) - 6 lectures

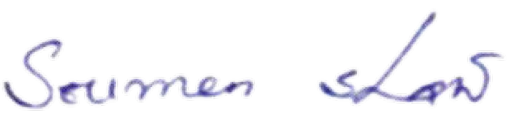
Fundamentals of Computing, Historical perspective, Early computers. Computing machine. Problems, Pseudo-code and flowcharts. Memory, Variables, Values, Instructions, Programs.

Module 2: (Introduction to C) 8 lectures

- The language of C: Phases of developing a running computer program in C. Data concepts in C: Constants, Variables, Expressions, Operators, and operator precedence in C.
- Statements: Declarations, Input-Output Statements, Compound statements, Selection Statements. Conditions, Logical operators, Precedences. Repetitive statements, While construct, Do-while Construct, For construct.
- Data types, size and values. Char, Unsigned and Signed data types. Number systems and representations. Constants, Overflow.
- Arrays. Strings. Multidimensional arrays and matrices.

Module 3: (Modular Programming and Example Problems) : 8 lectures

- Functions: The prototype declaration, Function definition.
- Function call: Passing arguments to a function, by value, by reference. Scope of variable names. Recursive function calls, Tail recursion. Analysing recursion, - Tree of recursion, linear recursion.
- Sorting problem: Selection Sort, Insertion Sort, Comparison between sorting algorithms. Sorting in multidimensional arrays. Sorting in strings.
- Search problem: Linear search and binary search. Comparison between search procedures. Recursive and Iterative formulations.



Module 4: (More Data Types in C) 8 lectures

- Pointers: Pointer variables. Declaring and dereferencing pointer variables. Pointer Arithmetic. Examples. Accessing arrays through pointers. Pointer types, Pointers and strings. String operations in C.
- Structures in C: Motivation, examples, declaration, and use. Operations on structures. Passing structures as function arguments. type defining structures.
- Self-referential structures. Dynamic Data Structures. Linked Lists. Examples.
- File input-output in C. Streams. Input, output and error streams. Opening, closing and reading from files. Programming for command line arguments.
- Numerical errors due to data representations and machine precision. Approximation and error analysis. Illustration through examples.

Course Outcome:

- Participants will gain an understanding of the basic syntax and structure of the C programming language.
- Furthermore, they will learn to identify its key features and advantages and write basic programs using C.

Course Textbook:

- E. Balagurusamy, “Programming in ANSI C” Tata McGraw Hill, 2004.

References Textbooks:

- R. G. Dromey, “How to Solve It By Computer”, Pearson, 1982
- A.R. Bradley, “Programming for Engineers”, Springer, 2011
- Kernighan and Ritchie, “The C Programming Language”, (2nd ed.) Prentice Hall, 1988
- E. Balagurusamy, “Programming in ANSI C” Tata McGraw Hill, 2004.
- V. Rajaraman, “Computer Oriented Numerical Methods” Prentice Hall of India, 1980.
- Y. Kanetkar, “Let Us C” BPB Publication, 1999.

Soumen Lahiri

EVALUATION POLICY FOR THE ADD-ON COURSE:

The basic philosophy behind the Evaluation policy for this 30 Hours Add-on course is to objectively judge the participants (students) whether the concepts were understandable to them or not and whether they could apply these concepts to solve numerical and conceptual problems.

The Evaluation would be done through 2 components –

i) End of the course Assessments (Written Test) [Total Marks: **30**]

ii) Practical/LAB [Total Marks: **20**]

Total Marks of the Evaluation process would be – 50 Marks

TABLE FOR QUALIFICATION TOTAL SCORE (OUT OF 50)	GRADE
45 – 50	**O – OUTSTANDING**
40 – 44	**E – EXCELLENT**
35 – 39	**A – VERY GOOD**
30 – 34	**B – GOOD**
25 -29	**C - FAIR**
BELOW 25	**F - FAILED**

GENERAL RULES AND REGULATIONS:

- Students must attend and appear for all the Module-End Assessments. If any student fails to submit any of the Module-End Assignments or fails to attend any of the Module End Assessment examinations, the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
- Students must attend and appear for the Course-End Assessment Examination. If any student fails to submit the Course-End Assessment or fails to attend the Course-End Assessment Examination, the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
- Students must attend and appear for the Course-End Viva. If any student fails to fails to attend the Course-End Viva, the particular Student would NOT BE ELIGIBLE FOR CERTIFICATE.
- Total Marks of Course Evaluation will be 50 Marks.
- Minimum 50% Marks has to be scored to receive any Certificate. There will be only ONE Attempt allowed for each of the Module-End Assessments and the Course-End Assessment.
- There will be NO PROVISION for Backlog Clearance.
- General Rules and Regulations of the College must be followed without any exception.
- Minimum 95% attendance is required to receive the certificate of the course.

Soumen Das