



# Department of Computer Applications

## National Institute of Technology, Jamshedpur

(An Institution of national importance under MHRD, Govt. of India)

Autumn Semester Session 2020 – 2021

Date: 25/08/2020

### Course Handout

**Batch** : MCA (1<sup>st</sup> Semester) -2020  
**Course Code** : CA3101  
**Course Title** : Computer Programming and Problem Solving Using C  
**Faculty In-Charge** : Dr. Chandrashekhar Azad  
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**Contact No.** : 9430148516

### Course Description:

This course provides introductory background in computer Programming and Problem solving for postgraduate students. Students must understand how a computer functions in addition to knowing how to program it. C is a popular programming language, which is commonly used by scientists and engineers to write programs for any specific applications. C is also a widely accepted programming language in the software industry. It has emerged as the language of choice for most application due to its speed, portability, and compactness of code.

### Scope

- To explain the basic concepts of C to the students
- Develop programming skills
- To understand the systematic techniques and approaches for constructing programs

### Objectives

- At the end of this course, the student will able to understand the importance of Computer Programming.
- The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

### Text Books:

- T1. Problem Solving and Program Design in C, Jeri R. Hanly, Elliot B. Koffman, Pearson Addison- Wesley.  
T2. Schaum's Outline of Programming with C, Byron Gottfried, 2<sup>nd</sup> Ed., McGraw-Hill Education.

### Reference Books:

- R1. Brian W. Kernighan, Dennis M. Ritchie: The C Programming Language, 2nd Ed., PHI.  
R2. Exploring C, Yashavant P. Kanetkar, 2nd Ed., BPB publication.

### Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Refer to chapter see (text book)
1-3	Programming language, introduction to Operating System, Write and Execute the first program	Introduction	T1
4-7	Introduction to the design and implementation of correct, efficient and maintainable programs, Structured Programming, Trace an algorithm to depict the logic	Fundamentals	T1, T2

8-12	Introduction: Algorithms, Flow charts, Problem solving methods, Need for computer languages, Structure of a C program, Data type, Constants, Variables, Identifiers, Key words, Declarations, Expressions, Statements and Symbolic constants.	Algorithms	T1, T2
13-19	Input and Output: getchar, putchar, scanf, printf, gets, puts functions, Pre-processor commands, Preparing and running a complete C program. Operators and expressions: Arithmetic, unary, logical, bit-wise, assignment and conditional operators, Library functions. Control statements: While, do-while, for statements, nested loops, if-else, switch, break, continue and goto statements, comma operator.	Input and Output C Programming	T2, R1
20-30	Functions: Defining and accessing function, passing arguments, function prototypes, recursion, use of library functions, storage classes. Arrays: Defining and processing an array, Passing array to a function, Multi dimensional arrays, String handling, Operations on strings.	Functions of C Programming	T2, R1
31-39	Pointers: Declarations, Passing pointer to a function, Operations on pointers, Pointers and arrays, Arrays of pointers. Structures and unions: Defining and processing a structure, Passing structure to a function, Pointers and structures, Unions, Dynamic memory allocation, defining and using stacks and linked lists. File handling: Open, Close, Create, File operations, Unformatted data files, Command line arguments. Fundamental notations: Primitive and composite data types, Times and space complexity of algorithms	Pointers and File Handling	T2, R1
40-50	Sequential search, Sorting arrays, Strings, Text files, The Standard C Preprocessor: Defining and calling macros, utilizing conditional compilation, passing values to the compiler, The Standard C Library: Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sin, alike Other Standard C functions.	The Standard C Pre-processor	T2, R1

### Evaluation Scheme (EC):

EC No.	Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
1.	Mid Term Examination	02 Hours	30%	Academic Calendar	Closed Book
2.	End Term Examination	03 Hours	40%	Academic Calendar	Closed Book
3.	Internal Assessment	--	30%	TBA	(Class Test, Attendance, Assignments/Reports/Projects/Seminars)

→ **Online consultation hour:** Monday to Friday, 5PM to 6PM, Online

→ **Notices:** All notices regarding the course will be displayed only on the Department of Computer Applications notice board

Faculty In-Charge  
**CA3101**