Lesson Plan
Programming in C: MCA-103

Code No.: MCA 103 **L T C**
Paper: Programming in C **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks including subparts, if any.

***OBJECTIVES** : After covering the core C in about 25 lectures the course shall aim to aquaint the students about advanced features of the language the following features are listed as suggested guideline for the teacher.*

- *Passing by value and pass by reference*
- *Difference between array names and pointers*
- *Allocating memory over the heap to two dimesional array (Matrices application could be taken as a case study)*
- *Pointer and pointer operations(Linked lists , doubly linked lists circular linked lists can be taken as a case study*
- *Pointers to functions and call back functions*
- *Bitwise operations and a case based upon these operations*
- *MACROs and their pitfalls*
- *Final case study could be an application making extensive handling of binary files.*

PRE-REQUISTE:

- Basic Programming

UNIT- I

Introduction: GCC, Using MAKE Utility, GDB, **C Basics:** History of C, Characteristics of C, C Program Structure, Variables, Defining Global Variables, Printing Out and Inputting Variables, Constants, Arithmetic Operations, Comparison Operators, Logical Operators, Order of Precedence, Conditionals (The if statement , The ? operator, The switch statement) Looping and Iteration (The for statement, The while statement, The do-while statement, break and continue) Arrays and Strings (Single and Multi-dimensional Arrays, Strings) Functions (Function Prototyping, passing parameters, returning values, recursion) Storage classes (auto, extern, static, register) **[No. of Hrs. : 10 Hrs]**

UNIT-II

Further Data Types: Defining New Data Types, Structures, Unions, Type-Casting, Enumerated Types, Low Level Operators and Bit Fields (Bitwise Operators, Bit Fields)

Pointers: Pointers arithmetic and Arrays, const pointers, void pointers, near, far and huge pointers

Dynamic Memory Allocation and Dynamic Structures: (malloc, calloc and realloc; sizeof, free, introduction to Linked Lists and dynamic 2- dimensional arrays)

Advanced Pointer Topics: (Pointers to Pointers, Pointer to array, Array of pointers, Command line input, Pointers to a Function, Implementing Callbacks) **[No. of Hrs. : 12 Hrs]**

UNIT -III

Lecture Duration: 1 Hr.

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The C Preprocessor: (#define, #undef, #include, #if -- Conditional inclusion, Other Preprocessor Commands) **C, Linux and Standard Libraries:** (Advantages of using Linux with C, Using Linux System Calls and Library Functions) Integer Functions, Random Number, String Conversion, Searching and Sorting: <stdlib.h> Mathematics: <math.h> (Math Functions, Math Constants), Input and Output (I/O):stdio.h Reporting Errors (perror(), errno, exit()) Streams (Predefined Streams, Redirection) Basic I/O (Formatted I/O, printf, scanf), String Handling: <string.h> (Basic String Handling Functions and safety issues, String Searching), Character conversions and testing: ctype.h, **Files** Character and Line Based I/O, Formatted I/O, Block I/O, File Positioning, Status Functions, Deletion and Renaming, Temporary Files

[No. of Hrs. : 11 Hrs]

UNIT -IV

File Accessibility and Directories (access, stat, chmod, chown …, chdir, chroot…), **Process Control**: (Running Linux Commands from C, fork(), the exec family, wait(), exit()), Thread creation-a simple implementation. **[No. of Hrs: 09 Hrs]**

TEXT BOOKS:

1. Yashwant Kanetkar, "Let us C", BPB Publications, 2002.
2. Mark Mitchell, Jeffrey Oldham, and Alex Samuel, "Advanced Linux Programming**",** New Riders Publishing, 2001.
3. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000

REFERENECES:

1. Yashwant Kanetkar, "Pointers in C", BPB Publications, 2002.
2. Paul Deitel and Harvey Dietel, "How to Program", PHI, 6th Ed., 2010.
3. Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", PHI, 3rd Ed., 2007.
4. Jeri R. Hanly and Elliot B. Koffman, "Problem Solving and Programming in C", Pearson, 5th Ed. 2007.
5. Rama N. Reddy and Carol A. Ziegler, "C Programming for Scientist and Engineers with Applications", Jones and Bartlet, 2010.

Lecture Duration: 1 Hr.

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Number of Theory Hours per week 4 hrs

Books Recommended

Primary Text Book

1. Yashwant Kanetkar, "Let us C", BPB Publications, 2002 [YKC]
2. Mark Mitchell, Jeffrey Oldham, and Alex Samuel, "Advanced Linux Programming", New Riders Publishing, 2001 [MJA]

Reference Book

1. Yashwant Kanetkar, "Pointers in C", BPB Publications, 2002 [YKP]
2. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI., 2000. [KNR]

Topic wise Schedule		
Topic	**Book**	**Duration**
History of C, Characteristics of C, C Program Structure, Variables, Defining Global Variables, Printing Out and Inputting Variables, Constants,	[YKC] Chapter 1, 11;	Two hours
Operators (Arithmetic operations, comparison operators, Logical operators, order of precedence, conditionals)	[YKC] Chapter 1, 14	Two Hours
Control Constructs: Decision Control Constructs: If, Nested If, Switch Looping Constructs: while, for, do…while, usage, nesting of loops, printing patterns	[YKC]Chapter 2, 4 [YKC] Chapter 3	One Hour Two Hours
Arrays: Arrays: Intro 1D, processing Arrays: 2D, processing Strings	[YKC] Chapter: 8 [YKC] Chapter: 8 [YKC] Chapter: 9	One Hour One Hour One Hour
Use of gdb and MAKE	[MJA] Chapter:1	Two Hours

Lecture Duration: 1 Hr.

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Functions: Functions, Intro, Call by Value	[YKC] Chapter: 5	One Hour
Intro to pointers, Call By Reference, Storage Classes	[YKC] P: 221-234	One Hour
Recursion	[YKC] Chapter: 5	Two Hours
Structures: Intro, typedef, Passing to functions, Returning from functions, Nested, Recursive	[YKC] Chapter: 10	One Hour
Structures: Pointer members, Pointers To, Array Members, Arrays of Structures, Bit Fields, significance, usage	[YKC] Chapter: 10	Two Hours
Unions: significance, usage enum	[YKC] P: 524-530	Two Hours
Arrays & pointers, const pointers, void pointers, near, far and huge pointers	[YKC] Chapter: 8	Two Hours
Dynamic allocation of memory		One Hour
Dynamic Structures (Linked Lists…)		Three Hours
Arrays of pointers, Pointer to array, Pointer to pointer, Pointer to functions, Callbacks	[YKC] P: 506-509, 515	Four Hours
Preprocessor Directives: Macros with arguments Vs. Functions, #, ##	[YKC] Chapter: 7	Two Hours
Conditional Compilation, Multi-file Programming		
Library Functions	[YKC] Appendix: B	Two Hours
Files Character and Line Based I/O, Formatted I/O, Block I/O, File Positioning, Status Functions, Deletion and Renaming, Temporary Files	[YKC] Chapter: 15	Four Hours
File Accessibility and Directories (access, stat, chmod, chown …, chdir, chroot…),	[MJA]	Two Hours

Lecture Duration: 1 Hr.

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Process Control: (Running Linux Commands from C, fork(), the exec family, wait(), exit()), Thread creation-a simple implementation	[MJA] Chapter:3 [MJA] Chapter: 4	Two Hours Two Hours
		45 Hours

Lecture Duration: 1 Hr.

Lesson Plan
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Aug 2011

Week – 1 Unit – 1 (4)

Week – 2 Unit - 1 (4)

Week – 3 Unit – 1 (4)

Week – 4 Unit – 1 (4)

Sep 2011

Week – 5 Unit – 2 (4)

Week – 6 Unit – 2 (4)

Week – 7 First internal

Week – 8 Unit – 2 (4)

Oct 2011

Week – 9 Unit – 2 (3) + Unit – 3 (1)

Week – 10 Unit – 3 (4)

Week – 11 Unit – 3 (3) + Unit – 4 (1)

Week – 12 Unit – 4 (4)

Nov 2011

Week – 13 Unit – 4 (1)

Week – 14 Second Internal

Testing Schedule

Surprise Test	29/08	10/10	
Scheduled Test	05/09	24/10	
Home Assignment	Assignment will be given after each major topic		
	Ass-1	Ass-2	Ass-3
	Ass-4	Ass-5	Ass-6

Lecture Duration: 1 Hr.