



BHARATI VIDYAPEETH'S
INSTITUTE OF COMPUTER APPLICATIONS & MANAGEMENT (BVICAM)
 (Affiliated to Guru Gobind Singh Indraprastha University, Approved by AICTE, New Delhi)
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Lesson Plan Version 10.0

Course: MCA-103 - Programming in C		
MCA - 1 st Semester	No. of Theory Hours per Week: 04	No. of Practical Hours per Week: 4

Course Outcome (CO):

COs for Theory (MCA-103):	
CO1	Understand the basics of C programming like data type primitives, control structures, arrays, functions & storage classes and apply them for program development. (BTL2)
CO2	Create, apply and extend advanced data types, pointers and dynamic memory allocation functions for the solution of complex problems. (BTL3&6)
CO3	Implement the various C pre-processor directives, standard library functions (system calls using Ubuntu) and file handling techniques.(BTL3)
CO4	Explore and illustrate C programming skills to control and manipulate files, directories and processes in Ubuntu for building real-time software utilities.(BTL4)

Recommended Books:

Books	S. N.	Details of the Books
Text Books	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]
	3.	B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PHI, 2000. [KNR]
Reference Books	1.	Yashwant Kanetkar, "Pointers in C", BPB Publications, 2002.[YKP]
	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.
	6.	Kerrisk Michael, "The Linux Programming Interface", NoStarch Press, 2010. [MK]

Lecture No.	Topics / Concepts to be Covered	Reference of the Book and its Chapter
UNIT - I		
1.	C Basics: History of C, Characteristics of C, C Program Structure	Chapter-1 [YKC]
2.	Variables, Defining Global Variables, Printing Out and Inputting Variables, Constants, .	Chapter-1,11 [YKC]
3.	Arithmetic Operations, Comparison Operators, Logical Operators, Order of Precedence	Chapter-1,14 [YKC]
4.	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)	Chapter-1-3, 14 [YKC]
5.	Arrays (Single and Multi-dimensional Arrays)	Chapter-8 [YKC]
6.	Strings in C, String manipulation through <string.h>.	Chapter-9 [YKC]
7.	Strings in C, String manipulation through <string.h>.	Chapter-9 [YKC]
8.	Functions (Function Prototyping, passing parameters, returning values).	Chapter-5 [YKC]
9.	Recursion	Chapter-5 [YKC]
10.	Storage classes (auto, extern, static, register).	Chapter-6, pp. 223-233 [YKC]
11.	Use of gdb and MAKE	Chapter-1 [MJA]
12.	Buffer Reserved for Revision of Unit I	
UNIT - II		
13.	Further Data Types: Defining New Data Types, Structures.	Chapter-10 [YKC]
14.	Pointer members, Pointers To, Array Members, Array of Structures	Chapter-10 [YKC]
15.	Unions, Type-Casting.	Chapter-15 pp. 524-530 [YKC]
16.	Enumerated Types, Low Level Operators and Bit Fields (Bitwise Operators, Bit Fields)	Chapter-15 [YKC]
17.	Pointers: Pointers arithmetic and Arrays	Chapter-16 [YKC]
18.	const pointers, void pointers, near, far and huge pointers	Chapter-8, 16 [YKC]

Lecture No.	Topics / Concepts to be Covered	Reference of the Book and its Chapter
19.	Dynamic Memory Allocation and Dynamic Structures: (malloc, calloc and realloc; sizeof, free)	Chapter-16 [YKC], [YKP]
20.	Introduction to Linked Lists and dynamic 2-dimensional arrays	Chapter-16 [YKC], [YKP]
21.	Advanced Pointer Topics: (Pointers to Pointers, Pointer to array.	Chapter-16 [YKC], [YKP]
22.	Array of pointers, Command line input	Chapter-16 [YKC], [YKP]
23.	Pointers to a Function, Implementing Callbacks	Chapter-16 [YKC], [YKP]
24.	Buffer Reserved for Revision of Unit II	
	UNIT - III	
25.	The C Preprocessor: (#define, #undef, #include, #if -- Conditional inclusion, Other Preprocessor Commands)	Chapter-7 [YKC]
26.	(Advantages of using Linux with C, Using Linux System Calls and Library Functions)	Chapter-20 [YKC] Appendix: B
27.	Integer Functions, Random Number, String Conversion, Searching and Sorting: <stdlib.h>	Appendix: B [YKC]
28.	Integer Functions, Random Number, String Conversion, Searching and Sorting: <stdlib.h>	Appendix: B [YKC]
29.	Mathematics: <math.h> (Math Functions, Math Constants)	Appendix: B [YKC]
30.	Mathematics: <math.h> (Math Functions, Math Constants)	Appendix: B [YKC]
31.	Input and Output (I/O):stdio.h	Appendix: B [YKC]
32.	Input and Output (I/O):stdio.h	Appendix: B [YKC]
33.	Reporting Errors (perror(), errno, exit()) Streams (Predefined Streams, Redirection) Basic I/O (Formatted I/O, printf, scanf),	Appendix: B [YKC]
34.	String Handling: <string.h> (Basic String Handling Functions and safety issues, String Searching).	Chapter-9, Appendix: B [YKC]
35.	String Handling: <string.h> (Basic String Handling Functions and safety issues, String Searching).	Chapter-9, Appendix: B [YKC]
36.	Character conversions and testing: ctype.h	Appendix: B [YKC]
37.	Files Character and Line Based I/O	Chapter-12 [YKC]
38.	Formatted I/O, Block I/O, File Positioning,	Chapter-12 [YKC]
39.	Status Functions, Deletion and Renaming,	Chapter-12 [YKC]

Lecture No.	Topics / Concepts to be Covered	Reference of the Book and its Chapter
	Temporary Files.	
40.	Buffer Reserved for Revision of Unit III	
	UNIT - IV	
41.	File Accessibility and Directories (access, stat, chmod, chown	Chapter-15 [MK]
42.	..., chdir, chroot...)	Chapter-15 [MK]
43.	Process Control: (Running Linux Commands from C, fork())	Chapter-3 [YKC]
44.	the exec family, wait(), exit().	Chapter-3 [YKC]
45.	the exec family, wait(), exit()	Chapter-3 [YKC]
46.	Thread creation-a simple implementation.	Chapter-4 [YKC]
47.	Thread creation examples	Chapter-4 [YKC]
48.	Thread creation examples	Chapter-4 [YKC]
49.	Buffer Reserved for Revision	
50.	Buffer Reserved for Revision	

Testing Schedule:

Nature of Test	August	September	October	November
Surprise Test (ST)	-	-	ST in any of the Weeks	-
Mid Term Test (MT)	-	MT in 2nd / 3rd Week	-	-
Class Test (CT)	CT in any of the Weeks	-	-	CT in any of the Weeks
Supplementary Test (Sp.T)	-	-	-	Sp. T in 1 st week
Assignment Submission Schedule	Assignment-1 is to be submitted One Week after completion of Unit-1 and Unit-2. Assignment-2 is to be submitted One Week after completion of Unit-3. Assignment-3 is to be submitted One Week after completion of Unit-4.			

Suggested Topics for Presentation:

S. No.	Suggested Topics for Presentation
1.	Console I/O Mechanisms in C
2.	Techniques for Passing Arguments to Functions
3.	GDB
4.	Passing Arrays to Functions
5.	User-Defined Datatypes
6.	Preprocessor Directives
7.	Dynamic Memory Allocation
8.	File Reading & Writing in C
9.	Pointers to Functions
10.	Makefile
11.	Function Prototyping & Recursion
12.	Constant Pointers versus Pointers to a Constant
13.	Process Control in C
14.	Thread Creation in C
15.	Process versus Thread in C
16.	Linked List Implementation in C
17.	Reporting Errors in C (perror(), perror(), errno)
18.	Implementation of Pointers to Pointers
19.	File and Directory Access in C
20.	Command Line I/O in C
21.	Storage Classes in C
22.	Program Termination in C
23.	Searching and Sorting through <stdlib.h>
24.	Standard (ANSI) versus Non-Standard C



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Lesson Plan Version 10.0

Course: MCA-153 - Programming in C Lab	
MCA - 1st Semester	No. of Practical Hours per Week: 2 Labs of 2 Hours each

Course Outcome (CO):

COs for Practical (MCA-153):	
CO1	Develop programs in C for different algorithms using basic building blocks of the C language. (BTL6)
CO2	Develop efficient programs using advanced data types, pointers and dynamic memory allocation functions. (BTL6)
CO3	Implement real-world computing solutions through appropriate usage of the pre-processor as well as file handling on Ubuntu environment, using library functions and system calls. (BTL3)
CO4	Apply C constructs to programming problems to control, manipulate files, directories and processes on Ubuntu. (BTL3)
CO5	Work in teams to develop project for real-life cases. (BTL6)

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	6.	Kerrisk Michael, "The Linux Programming Interface",

Week No.	Lab No.	Topics / Concepts to be Covered	Assignment No.
1.	1.	Syntax and structure of C-program structure on the Ubuntu environment alongwith usage of GCC.	Assignment A, Problems [AP ₁ -AP ₅]
	2.	Basic constructs of C programming along with valid expressions for problem solving.	Assignment A, Problems [AP ₆ -AP ₇], Advanced Problems [AA ₁ -AA ₂]
2.	3.	Usage of decision control, branching and looping structures	Assignment A, Advanced Problems [AA ₃ -AA ₆]
	4.	Usage of constants, operators etc	Assignment B, Problems [BP ₁ -BP ₅]
3.	5.	Pattern Programming	Assignment B, Problems [BP ₆], Advanced Problems [BA ₁ -BA ₂]
	6.	Arrays (Single-dimensional Arrays).	Assignment C, Problems [CP ₁ -CP ₆]
4.	7.	Arrays (Multi-dimensional Arrays).	Assignment C, Problems [CP ₇], Advanced Problems [CA ₁ -CA ₃]
	8.	String Handling	Assignment D, Problems [DP ₂ -DP ₇]
5.	9.	String Manipulation	Assignment D, Advanced Problems [DA ₁ -DA ₄]
	10.	Recursion and Command line parameters.	Assignment D, Problems [DP ₁ ,DP ₅], Advanced Problems [DA ₆]
6.	11.	Buffer reserved for Revision	Assignment A-D
	12.	New data types like structures and union	Assignment E, Problems [EP ₁ -EP ₄], Advanced Problems [EA ₁ -EA ₂]
7.	13.	Usage of Enums, bitfields or typedef	Assignment E, Problems [EP ₅ -EP ₆], Advanced Problems [EA ₃ -EA ₄]
	14.	Pointers.	Assignment F, Problems [FP ₁ ,FP ₇], Advanced Problems [FA ₂]

Week No.	Lab No.	Topics / Concepts to be Covered	Assignment No.
8.	15.	Dynamic memory allocation	Assignment F, Problems [FP ₂ -FP ₄],
	16.	File Handling and Manipulation.	Assignment F, Problems [FP ₅ -FP ₆], Advanced Problems [FA ₁ -FA ₂]
9.	17.	File Handling and Manipulation.	Assignment F, Advanced Problems [FA ₃ -FA ₆]
	18.	Buffer reserved for Revision	Assignment E-F
10.	19.	C Pre-processor	Assignment G, Problems [GP ₁ -GP ₅]
	20.	Usage of library functions	Assignment G, Problems [GP ₆], Advanced Problems [GA ₁ -GA ₃]
11.	21.	Buffer reserved for Revision	Assignment G
	22.	Directory Control and Manipulation through System Calls.	Assignment H, Problems [HP ₁ -HP ₃ , HP ₅], Advanced Problems [HA ₃ -HA ₄]
12.	23.	Process Control	Assignment H, Problems [HP ₄], Advanced Problems [HA ₁]
	24.	Thread Creation	Assignment H, Problems [HP ₆], Advanced Problems [HA ₂]
13.	25.	Miscellaneous Exercises	Assignment I, Problems [IP ₁ -IP ₈]
	26.	Buffer reserved for Revision	Assignment H-I

Suggested Topics for Project:

S. No.	Suggested Topics for Project
1.	Hangman Game
2.	MCD Multi-level Parking & Billing Utility
3.	AC Feasibility Calculator
4.	Alarm Clock Utility
5.	Login-Logout Tracker
6.	See your C Tester
7.	Power Vocab
8.	Sales Data Forecaster

S. No.	Suggested Topics for Project
9.	Automatic Traffic Challan Generator Utility
10.	Network Mapper
11.	Snake Mania Game
12.	Metro Route Tracer Utility
13.	File Encryption-Decryption Utility
14.	Horoscope Utility
15.	Sudoku Game
16.	Client Server Chat Utility
17.	Password Manager
18.	Food Ordering Utility
19.	Typing Game
20.	KBC Quiz Game Utility