LNCT UNIVERSITY, BHOPAL

Programme:- MCA   **Semester - I**   **wef: July 2022**

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Principles & Programming in C	MCA-101	L	T	J	EST	CAT	Total
		3	1	0	80	20	100

Course Objective	The objective of this course is to provide the students with foundations in the basic concepts of C programming and data structures. Also to teach the students how to develop the programming logics that are appropriate for problems to solve them.

Units	Contents (*Theory*)	Hours /week
I	**Introduction to Computing** – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples. **Introduction to C–** History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.	8
II	**Control Statements**-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.	8
III	**Functions:** Introduction to Functions, Function Declaration, Function Categories, Standard Functions, Parameters and Parameter Passing, Call – by value/reference, Recursion, Global and Local Variables, Storage classes	8
IV	**Arrays:** Introduction to Arrays, Array Declaration, Single and Multidimensional Array, Memory Representation, Matrices, Strings, String handling functions. **Structure and Union:** Declaration of structure, Accessing structure members, Structure Initialization, Arrays of structure, nested structures, Unions	8
V	**File Management:** Introduction, Creating a data file, opening and closing a data file, processing a data file. **Pointers:** Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers, Pointers and Arrays, Dynamic Memory Allocation.	8

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Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
Yashvant P Kanetkar	Let Us C	VII	BPB Publications, New Delhi.
E. Balagurusami	Programming in ANSI C	IV	Tata McGraw Hill
R. S. Salaria	Problem Solving and Programming in C	II	
H.Schildt, Osborne	C Made Easy		McGraw-Hill
Yashwant Kanetkar	Understanding Pointers in C	V	BPB
COURSE OUTCOMES: Students will be able to			
CO1	Understand the fundamentals and structure of programming language C.		
CO2	Understand and implement control structure C Language.		
CO3	Know the need and implementation of functions and its various calling conventions.		
CO4	Understand and implement structure and union data types and their differences		
CO5	Understand and implement file structure and their usage.		

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Programme:- MCA　　　　**Semester - I**　　　　**wef: July 2022**

Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Discrete Mathematics	MCA-102	3	1	0	80	20	100

Course Objective	The objective of this course is to provide an understanding on knowledge of Discrete Mathematics and inculcate the concepts of Graphs.

Units	Contents (*Theory*)	Hours /week
I	**Introduction to Discrete Mathematical Structures :** Sets, Relations and functions-Sets, Types of Sets, Multisets, Operations on Sets, Relations and Properties of Relations, Representation of Relations, Equivalence Relation, Closures of Relations, Functions ,injection, Surjection and Bijective mapping, Composition of functions, Introduction to characteristic functions	8
II	**Fundamentals of Logic:** Proposition, Logical Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference; The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems	8
III	**Trees:** Properties of trees; Pendant vertices in a tree: Center of a tree; Rooted an binary trees; Spanning Trees – spanning tree algorithms; Fundamental circuits; Spanning trees of a weighted graph, cutsets and cut – Vertices; Fundamental cutsets; connectivity and separativity.	8
IV	**Graph Theory:** Types of Graphs, Path and Circuits, Eulerian Path and Circuits, Hamiltonian Path and Circuits, Shortest Path Algorithms	8
V	**Group:** Definitions and Properties, Coset & Subgroup, Normal subgroup, Homomorphism of groups, Cyclic Group, Permutation Group. Matrix Algebra: Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigenvectors-Inverse of a Matrix - Cayley Hamilton Theorem	8

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Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
Kenneth H. Rosen	Discrete Mathematics and its Applications		McGraw Hill
Kolman, Busby & Ross	Discrete Mathematical Structures		PHI
Narsingh Deo,	Graph Theory With Application to Engineering and Computer Science		PHI
Vinay Kumar	Discrete Mathematics		BPB Publications
Trembly J.P. & Manohar P.	Discrete Mathematical Structures with Applications to Computer Science		McGraw Hill

COURSE OUTCOMES: Students will be able to	
CO1	Describe useful standard library functions, create functions, and declare parameters
CO2	Explain the laws of logic.
CO3	Find spanning trees of a graph.
CO4	Find shortest and Hamiltonian path.
CO5	Calculate Eigen values of equations

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Computer Architecture	MCA-103	3	1	0	80	20	100

Course Objective	The main objective is to understand the concept of computer system and organization, memory management, and parallel processing concepts.

Units	Contents (*Theory*)	Hours /week
I	**Fundamentals of Digital Logic:** Boolean Algebra, Logic Gates, Simplification of Logic Circuits: Algebraic Simplification, Karnaugh Maps. Combinational Circuits : Adders, Mux, De-Mux, Sequential Circuits : Flip-Flops (SR, JK & D), Counters : synchronous and asynchronous Counter	8
II	**Computer System:** Comparison of Computer Organization &Architecture, Computer Components and Functions, Interconnection Structures. Bus Interconnections, Input / Output: I/O Module, Programmed I/O, Interrupt Driven I/O, Direct Memory Access	8
III	**Memory System Organization**: Classification and design parameters, Memory Hierarchy, Internal Memory: RAM, SRAM and DRAM, Interleaved and Associative Memory. Cache Memory: Design Principles, Memory mappings, Replacement Algorithms, Cache performance, Cache Coherence. Virtual Memory, External Memory : Magnetic Discs, Optical Memory, Flash Memories, RAID Levels	8
IV	**CPU Organization**: CPU Building Blocks, CPU Registers and BUS Characteristics, Registers and System Bus Characteristics; Instruction Format; Addressing Modes; Interrupts: Concepts and types; Instruction and Execution Interrupt cycle; Hardwired and Micro Program control; Introduction to RISC and CISC	8
V	**Multi-Processor Organization:** Parallel Processing, Concept and Block Diagram, Types (SISD, SIMD, Interconnect network, MIMD, MISD), Future Directions for Parallel Processors, Performance of Processors **Pipelining**: Data Path, Time Space Diagram, Hazards. Instruction Pipelining, Arithmetic Pipelining	8

Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
M. Morris Mano, edition	Computer System Architecture	3rd	PHI
Pal Chaudhary	Computer Organisation and architecture		
Liu and Gibson	8086/ 8088 Microprocessor Assembly Language		
Tanenbaum	Structured computer organization-		
COURSE OUTCOMES: Students will be able to			
CO1	Describe the fundamental organization of a computer system		
CO2	Explain addressing modes, instruction formats and program control statements		
CO3	Learn memory hierarchies and their usage.		
CO4	Learn and Understand various addressing modes.		
CO5	Learn parallel processing concepts.		

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Soft Skills & Entrepreneurship	MCA-104	3	1	0	80	20	100

Course Objective	The objective of this course to teach students basics of communication and to enhance their communication skills

Units	Contents (*Theory*)	Hours /week
I	Listening: Barriers of Listening skill -Approaches to Listening –How to improve Listening exercises. Speaking: Paralanguage: Sounds, stress, intonation - Art of conversation – Presentation skills – Public speaking - Expressing Techniques.	8
II	Reading: Kinds of Reading – Causes of reading difficulties – Reading strategies – exercises. Writing: Effective writing– Paragraph, Essay, Reports, Letters, Articles, Notices, Agenda & Minutes.	8
III	Communication: Modes of Communication - Barriers – Interpersonal skills, Negotiation skills Non- Verbal communication – Etiquettes.	8
IV	Group Dynamic skills: Group Discussion– Team building & Team work – Be a manager or leader – Decision making – creativity – Time & Stress management skills.	8
V	Interviews kills: Types of Interviews – Preparing for interview – Preparing a CV – Structuring the interview , Mock Interview _ Quick Tips.	8

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Sanghi Seema	Improve your communication skills	2nd	
Dr. Alex, K.	Soft sill: know yourself & Know the world		
Ashley, Roderic	How to enhance your employability		

COURSE OUTCOMES: Students will be able to

CO1	Learn critical and innovative thinking.
CO2	Learn about oral, written, and visual communication.
CO3	Learn different communication barriers
CO4	Learn about group discussion and stress management
CO5	Learn different types of interviews.

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Programme:- MCA   **Semester - I**   **wef: July 2022**

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Operating System & Multi Media	MCA-105	L	T	J	EST	CAT	Total
		3	1	0	80	20	100

Course Objective	The main objective is to understand the concepts, techniques of operating system and multi media.

Units	Contents (*Theory*)	Hours /week
I	**Operating system concepts:** OS definition and services; Types and features : batch systems, multiprogramming, multitasking, parallel systems, distributed systems, real-time systems, time-sharing systems, PC systems; System Calls types, System Programs	8
II	**Process vs. Thread:** process states, process control block; inter-process communication; Process Synchronization:, Classical problems of synchronization; CPU Scheduling: Criteria; Algorithms: FCFS, SJF, Priority, Round- Critical section problem and solution criteria, Semaphores Robin, Real-time	8
III	**Memory Management:** Paging and Segmentation approaches, virtual memory, Demand Paging and Page Replacement algorithms; Deadlocks: necessary conditions, prevention, avoidance and recovery, banker's algorithm	8
IV	**File management:** File system Structure, allocation methods: Contiguous allocation, Linked allocation, indexed allocation: free space management: Bit vector, linked list, grouping, counting: Directory implementation: Linear List, Hash table. Device Management: Disk structure, Disk scheduling:, Selecting Disk Scheduling algorithm	8
V	**Multimedia**: MultiMedia concepts, design, hardware, standards – MPEG, JPEG, MIDI, multimedia design methodology, development and testing, Analog and Digital Sound and Video, Multimedia Tools **Basic of Animation:** Types of Animation, Simulating Accelerations, Computer Animation Tools, Applications	8

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Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
A. Silberschatz, Galvin	Operating System Concepts	8th	
Andrew S Tanenbaum, ,	Modern Operating Systems	3rd	Pearson Education
J. Archer Harris	Schaum's Outline of Operating Systems		McGraw-Hill
William Stallings	Operating System	8th	Pearson Education.
COURSE OUTCOMES: Students will be able to			

CO1	Explain multiprogramming and multi tasking.
CO2	Learn CPU Scheduling algorithms and Synchronization.
CO3	Learn the concepts of paging, segmentation and dead lock situation.
CO4	Learn Hash table and disk scheduling algorithms.
CO5	Learn multimedia and animation tools with their applications.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Tools & Methodology of IT World	MCA-106	L	T	J	EST	CAT	Total
		3	1	0	80	20	100

Course Objective	The main objective is to understand the concepts, techniques and principles of modern communication technology.

Units	Contents (*Theory*)	Hours /week
I	**Introduction and basic concept of modern communication and technology:** CDMA, WLL, GSM, VOIP, Bluetooth, Wi-Fi, Communication Technology: 2G, 3G, 4G, and 5G. Communication over radio, microwave systems, Communication satellite, radar, fiber optics, ISDN -their properties, Geographic Information System (GIS), Components of a GIS - H/ W,S/ W, Data, people, methods, working and application of GIS.	8
II	**Information Security:** Introduction, malicious programs, cryptography, digital signature, Firewall, Users Identification and Authentication, Security awareness and policies, Application areas requiring security. Mobile Commerce: Introduction, Growth, Success Stories of Mobile commerce, Technologies for mobile commerce, M-commerce in India, Digital Marketing.	8
III	**Artificial Intelligence:** Concept of Artificial Intelligence, Introduction to branches of Artificial Intelligence: Machine Learning, Neural Network, Robotics, Natural Language Processing, Expert System, and Fuzzy Logic. Applications of all the branches of AI, General application of AI.	8
IV	**Introduction to IoT:** Characteristics of IoT, physical design of IoT, Logical design of IoT, Functional blocks of IoT, home Automation, Industry applications, Surveillance and other IoT applications. Introduction to Virtual Reality (VR): Definition, Application of VR, Smart Systems, Embedded Systems.	8
V	**Computing and Cloud Computing:** History of Centralized and Distributed Computing, Overview of Distributed Computing, Cluster computing, Grid computing. Introduction to Cloud Computing - Cloud issues and challenges – Properties – Characteristics – Service models, Deployment models. Cloud resources: Network and API. Virtual and Physical computational resources – Data-storage.	8

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Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
Alex Leon & M.Leon	Fundamental of Information Technology		Vikas Publications, New Delhi
Rao M.N.	Cloud Computing		PHI
Internet of Things	Raj Kamal		McGraw Hill
ITL Education Solutions Ltd., Seventh mpression	Introduction to Information Technology		Pearson Education
Andrew S. Tanenbaum	Computer Networks	4 th	Pearson Education

COURSE OUTCOMES: Students will be able to	
CO1	Know the basic concepts of 2G, 3G technologies.
CO2	Learn the concepts of information security and mobile commerce.
CO3	Learn the concepts of AI, natural language processing and neural network.
CO4	Learn the IoT mechanism and VR smart systems.
CO5	Know the concepts of cloud computing.

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Name of Paper	Paper Code	Practical				
		Credit		**Marks**		
		P	**J**	**ESP**	**CAP**	**Total**
Programming Lab in C	**MCA-107**	8	-	120	80	200

Content:

1. Write an algorithm and draw a flowchart to find the area of the following geometric figure :
   a) Triangle
   b) Rectangle
   c) Equilateral triangle
   d) Parallogram

2. Write an algorithm and draw a flowchart to print maximum of three numbers.

3. Write an algorithm and draw a flowchart to find the sum of all prime numbers between 1 to 50.

4. A Commercial bank has introduced an incentive policy of giving bonus to all its deposit holders. The Policies is as follows: a bonus of 2% of the balance held on 31st March is given to everyone irrespective of their balance and 5% is given to female account holder if their balance is more than 5000 (Using Nested if Else).

5. Write a Program to find out the grade of student when the marks of five subjects are given(Using Else-if-ladder).The method of assigning grade is as follow .

   Per >= 85   'A'
   Per < 85 & Per>=70   'B'
   Per < 70 & Per>=50   'C'
   Per < 50 & Per>=40   'D'
   Per < 40   'E'

6. Write a Menu driven program which has the following option. (using switch case).
   a) Even/Odd.
   b) Greatest of two number.
   c) Sum and average of 3 numbers
   d) Area and Perimeter of a circle.
   e) Exit

Once a menu item is selected the appropriate action should be taken and once this action is finished, the menu should reappear. Unless the user selects the Exit option the program should continue to work.

7. WAP to reverse the digits of the number entered by the user. For example, 12345 should be writer as. 54321

8. WAP to compute the sum of the digits of a given integer number.

9. Write a program to find the number of and sum of all integers between 1to100 that are divisible by 7.

10. Write a programs to print the following patterns using for loop.

a) 1	b) *****	c) 1	d) *
2 3	****	22	***
4 5 6	***	333	*****
7 8 9 10	**	4444	*******
11 12 13 14 15	*	5 5 5 5 5	*********

11. Write a recursive function that will generate and print the first n Fibonacci number. Test the function for n=10 and n=15.

12. Write a function to calculate the factorial of a number using category return value & passing argument.

 [Hint: if n==0 or n==1 return 1 Else return n!].

13. Write a recursive program to find the Greatest Common Divisor of two numbers.

14. Write a program to print 15 numbers in ascending order.

15. Write a program to search an element in an array.

16. Write a program to print diagonal elements and its sum of a matrix.

17. Write a program to find the multiplication of two matrices.

18. Write a menu driven program which perform the following operations using string functions.
    a) Length of a string
    b) Compare two Strings
    c) Copy one string to another
    d) Concatenate two Strings

19. Write a program to check and print whether a string is palindrome or not.

20. Write a program to swap two numbers using call by value and call by address.

21. Write a program using pointers to compute the sum of all elements stored in an array.

22. Design a structure student to contain name, roll no, total marks obtained. Write a program to print percentage along with the information.

23. Design a union employee to contain emp_name, deptment, designation and salary. Write a program to print employee information.
24. Write a program to open a file employee and store the following information in it.
    a. Emp_id
    b. Emp_name
    c. Department
    d. Salary
25. Write a program to open a file book and store the following information in it.
    a. title
    b. author
    c. pages
    d. prize

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Operating System Lab	**MCA-108**	2	0	30	20	50

Content:

1. Program for CPU Scheduling Algorithms to find turnaround time and waiting time.

    a) FCFS b) SJF c) Round Robin (pre-emptive) d) Priority

2. Program for File Allocation Strategies –

    a) Sequential b) Indexed c) Linked Memory

3. Program to simulate the following contiguous memory allocation techniques

    a) Worst-fit b) Best-fit c) First-fit

4. Program for any one of Deadlock Management Techniques

5. Program to simulate disk scheduling algorithms –

    a) FCFS b) SCAN c) C-SCAN

6. Program for Page Replacement Algorithms –

    a) FIFO b) LRU c) LFU

7. Program to simulate producer-consumer problem using semaphores

8. Program to simulate the concept of Dining-Philosophers problem.

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Name of Paper	Paper Code	Practical				
		Credit		**Marks**		
Mini Project in C	**MCA-109**	**P**	**J**	**ESP**	**CAP**	**Total**
		0	2	30	20	50

Note:-Design a project using file to automate the working of an application.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Disaster Management	***MCA-111**	-	-	-			

Course Objective	The Programme has been framed with an intention to provide a general concept in the dimensions of disasters caused by nature beyond human control as well as the disasters and environmental hazards induced by human activities with emphasis on Natural disaster, Man-made disaster.

Units	Contents (*Theory*)	Hours /week
I	**Introduction:** Hazard, Risk, Vulnerability, Disaster; Disaster Management, Meaning, Nature Importance, Dimensions & Scope of Disaster Management, Disaster Management Cycle. National disaster management framework; financial arrangements for Disaster management, International Strategy for Disaster reduction	2
II	**Natural Disasters:** Meaning and nature of natural disasters, their types and effects , Hydrological Disasters - Flood, Flash flood , Drought, cloud burst, Geological Disasters- Earthquakes, Landslides, Avalanches, Volcanic eruptions, Mudflow Unit, Wind related- Cyclone, Storm, Storm surge, tidal waves, Heat and cold Waves, Climatic Change, Global warming, Sea Level rise, Ozone Depletion	2
III	**Man made Disaster:** CBRN – Chemical disasters, biological disasters, radiological disasters, nuclear disasters Fire – building fire, coal fire, forest fire, Oil fire	2
IV	**Types of Man – made Disasters:** Accidents- road accidents, rail accidents, air accidents, sea accidents Pollution and deforestation- air pollution, water pollution, deforestation, Industrial wastewater pollution, deforestation	2
V	**Disaster Determinants:** Factors affecting damage – types, scale population, social status, habitation pattern, physiology and climate. Factors affecting mitigation measures, prediction, preparation, communication, area and accessibility, population, physiology and climate	2

Text Books/ References Book:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
S.L. Goel	Disaster Administration and Management, Text & Case studies-		Deep and Deep Publications
G. K. Ghosh	Disaster Management		A.P.H. Publishing Corporation
Vinod K Sharma-	Disaster Management		IIPA
S. K .Singh, S.C. Kundu, Shobha Singh	Disaster Management		William Publications

COURSE OUTCOMES: Students will be able to	
CO1	Know disaster management processes and financial arrangements.
CO2	Know various natural disasters and its effects.
CO3	Know various Man Made disasters and its effects.
CO4	Know consequences of air pollution and deforestation.
CO5	Know disaster determinants and mitigation measures.