MCA I Sem/I Year Syllabus

ERA University, Lucknow
Department of Computer Science
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Fundamentals of Computers and Programming using C Language**	**Course Code:**	**MCA0101T**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
◉ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To learn basics of Computer fundamentals, memory and number systems. 2. To introduce the basic concepts like variable, datatypes, operators, decision making and looping statement along with arrays. 3. To learn functions, structure and union. 4. To learn advanced programming concepts of C language.				

Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	Understand basics of Computer fundamentals, Memory, I/O Devices and software.
CO2	Understand the basic concepts of C programming language and able to identify the need and use of programming in real world.
CO3	Use functions, pointers, array and string using C language.
CO4	Design and develop programs utilizing advance C programming concepts like structure, union, pre-processor and enumeration etc.
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 12 Marks Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction to Computer**: Definition, Block Diagram of Computer, Characteristics of Computer, Classification of Computers, History of Computers, Generation of Computers, Applications of computer. **Memory**: Memory Unit, Primary Memory, Secondary Memory. **Input devices**- Keyboard, Mouse, Scanners, **Output Devices**-Monitors, Size, Resolution, Refresh Rate, Video standard, Types of Printers, Plotter, Sound Card and Speakers. **Software Concepts**: Definition, System Software, Application Software, Utility Package. **Programming Languages**: Concept, Classification of languages, and introduction to Compiler, Interpreter, and Assembler.	**14**	**CO1**
Unit 2	**Overview of C Language:** Introduction, Salient features of C, Structure of C programs. **C Language Fundamentals:** Character set, Data type and sizes, Execution and Compilation of C programs. **Operators and Expressions:** Various type of operators used in C language. Types of expression, Precedence and associativity of expression. **Structure of C program: -** Compilation and execution. Various type of Input and Output function. Formatted input and Outputs function. **Control Statements:** if, if-else, Nested if else, else if ladder, Switch statement, Break, Continue, goto statement. **Loops:** Introduction, for loop,	**16**	**CO2**

	while loop, do-while loop, Nesting of loops. **Arrays:** Defining of Array, Types of Array, initialization and declarations. **String:** Character Arrays, Arrays and strings, String Manipulation.		
Unit 3	**Functions:** Built-in and user-defined function, Types of user defined function, Function prototype declaration, Function call, and function definition, Recursive functions, Array and functions. **Storage Classes** (static, automatic, register, extern). **Pointers:** Introduction, Pointer operators (&, *), **Parameter passing**: Call by value, Call by reference, Pointer to Pointer, **Dynamic Memory Allocation:** calloc () and malloc () functions.	**12**	**CO3**
Unit 4	**Structure and Union:** Defining structure and union, Declaration and initialization of structure and union variables, Differences between structure and union, enumeration. **File Handling:** Sequential file, Direct File, open (), fprintf (), fscanf (), reading mode file, writing and append mode file, opening Direct file, reading and writing of direct file, seekg (), seekp () functions.	**18**	**CO4**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	2	2	3	2					1	1		
CO2	2	3	3	1	1	3	2	2	2	1	1	1
CO3	3	2	2	3	1	2		1	1	3	1	1
CO4	2	3	3	2		3	1		2	3	1	

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. V. Rajaraman, "Fundamentals of Computers", PHI 2. Peter Norton's, "Introduction to Computers", TMH 3. Yashwant Kanitkar, "Let us C", BPB. 4. Gottfried, "Programming in C", Schaum's Series, Tata McGraw Hill.
Reference Books	1. D.S. Yadav, "Foundation of Information Technology", New Age International. 2. Programming in ANSI C, Balaguruswamy, Tata McGraw-Hill, 4th Edition, 2008. 3. Kernigham, Ritchie, "The C Programming Language", PHI, 1977, India, New Delhi. 4. Pointers in C, Yashwant Kanetkar, BPB Publication, 3rd Edition, 2003.
e-Learning	• https://www.tutorialspoint.com/computer_fundamentals/index.htm • https://www.geeksforgeeks.org/c-programming-language/ • https://onlinecourses.nptel.ac.in/noc22_cs40/preview • https://onlinecourses.swayam2.ac.in/cec19_cs06/preview

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	**Section A:** Contains **05** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **01 Marks.** **Section B:** Contains **02** descriptive questions and each question carries 2 marks. **Section C:** Contains **04** descriptive questions out of which **03** questions are to be attempted. Each question carries **05 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Quiz Test	04	Contains **04 descriptive questions.** Each question carries **01** Mark.
Assignment	05	Assignment to be made on topics and instruction given by subject teacher
Presentation	05	Presentation to be made on topics and instruction given by subject teacher

Attendance	04	As per policy
Total Marks	**30**	

Course created by: **Signature:**	**Approved by:** **Signature:**

ERA University, Lucknow
Department of Computer Science
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Fundamentals of Computers and Programming using C Language Lab**	**Course Code:**	**MCA0101P**	**Type:**	**Practical**
Credits	**02**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
◉ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To identify basic components of the computer system. 2. To introduce the basic concepts like variable, datatypes, operators of C language. 3. To learn decision making and looping statement along with arrays. 4. To learn functions, structure and union. 5. To learn advanced programming concepts of C language.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	Explain basics of Computer fundamentals, Memory, I/O Devices and software.				
CO2	Create programs to exhibit basic data types, variables, operations, conditional and looping statement using the C language.				
CO3	Demonstrate the concept of functions, pointers, array and string using C programs.				
CO4	Implement advanced C programming concepts like structure, union, and file handling etc.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	• Mid-term Practical Examination: 12 Marks • Experiment –Writing - 05 • Execution of Program - 05 • Practical File Record - 04 • Viva-Voce - 04				

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	1. Write C program to find largest of three integers. 2. Write C program to find factorial of an integer. 3. Write C program to check whether the given string is palindrome or not. 4. Write C program to find Sum of Digits of an integer & Product of digits of an integer. 5. Write C program to find whether the given integer is: A prime number. 6. Write C program for Pascal triangle.	**13**	**CO1**
Unit 2	1. Write C program to find sum and average of n integers using linear array. 2. Write C program to perform addition, multiplication, transpose on matrices. 3. Write C program to find factorial of n by recursion using user defined functions. 4. Write a C program to sort a Linear Array of number by Bubble Sort and Selection Sort. 5. Write C program to perform following operations by using user defined functions: Concatenation. 6. Write C program to find sum of n terms of series: n-n*2/2! + n*4/4! + …….	**15**	**CO2**
Unit 3	1. Write C program to interchange two values using: Call by value. 2. Write C program to interchange two values using: Call by reference.	**17**	**CO3**

	3. Write a C program for searching an integer in a linear array using Linear Search. 4. Write a C program for searching an integer in a linear array using Binary Search. 5. Write C program to sort the list of integers using dynamic memory allocation. 6. Write C program to display the mark sheet of a student using structure.		
Unit 4	1. Write C program to perform following operations on data files: 2. Read from data file (Sequential & Direct File). 3. Write to data file (Sequential & Direct File). 4. Write C program to copy the content of one file to another file using command line argument. 5. Write the Programs to print some pattern using star (*). 6. Write the Programs to print some pattern using Digits (1,2,3……). 7. Write the Programs to print some pattern using Alphabets, Digits and Star.	**15**	**CO4**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	2	2	1	2		2	1		1	1		
CO2	2	2	1	1	1	3		1	2	2	1	2
CO3	3	3	2	3	1	2	1		1	2	1	1
CO4	3	3	3	2		3		1	2	3	2	2

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. V. Rajaraman, "Fundamentals of Computers", PHI 2. Yashwant Kanitkar, "Let us C", BPB. 3. Gottfried, "Programming in C", Schaum's Series, Tata McGraw Hill.
Reference Books	1. Programming in ANSI C, Balaguruswamy, Tata McGraw-Hill, 4th Edition, 2008. 2. Kernigham, Ritchie, "The C Programming Language", PHI, 1977, India, New Delhi. 3. Computer Today, Suresh Basandra, Galgotia Publication, 1stedition, 2010.
e-Learning	• https://www.geeksforgeeks.org/c-programming-language/ • https://onlinecourses.nptel.ac.in/noc22_cs40/preview • https://www.tutorialspoint.com/computer_fundamentals/index.htm • https://onlinecourses.swayam2.ac.in/cec19_cs06/preview

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	**Section A:** Contains **04** practical questions out of which **03** questions are to be attempted. Each question carries **08 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Experiment –Writing	05	Will be decided by subject teacher
Execution of Program	05	Will be decided by subject teacher
Practical File Record	04	Practical file to be made on experiments and instruction given by subject teacher
Viva-voce	04	As per policy
Total Marks	**30**	

Course created by:

Signature:

Approved by:

Signature:

ERA University, Lucknow
Department of Computer Science
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Operating System**	**Course Code:**	**MCA0102T**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
◉ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To introduce the generic structure of an Operating System 2. To detail the concepts of Processes, Threads and Synchronization principles 3. To explain the students about the Memory Management, Protection 4. To provide an idea of different File Systems and I/O				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	Know different OS types and basic component of OS Architecture.				
CO2	Analyze issues in process management and evaluations of various scheduling algorithms.				
CO3	Understand memory management, paging and trashing.				
CO4	Understand and apply office automation tools.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 12 Marks Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks				

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction**: Operating system structure, OS services and Components, Types of operating system, Functions of OS. Operations of OS, OS design goals. **System Boot**: Introduction, System Boot, Dual boot operation, System components, **Operating-System Services**, **System Calls:** Types of System Calls, System Programs, System structure, Virtual Machines.	**15**	**CO1**
Unit 2	**Processes and Threads**: Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, **CPU scheduling** criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling. Interprocess Communication, Communication in Client Server Systems, Multithreading Models, Thread Libraries, Threading Issues, P-threads Basic Concepts.	**10**	**CO2**
Unit 3	**Memory Management**: Memory Management Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing, Operating- System Examples, Other Considerations.	**15**	**CO3**
Unit 4	**File System**: File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File System, NFS.	**20**	**CO4**
CO-PO and PSO Mapping			

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	1	1	3	2		2		2	1	2		
CO2	3	2	2	1	1	3	1	1	2	1	1	1
CO3	1	2	3	3		2	2	3	2	2	2	1
CO4	2	3	3	2	1	3		2	3	3	2	2

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. Silberschatz, Galvin and Gagne, "Operating System Concepts", 10th Edition, John Wiley & Sons Inc. 2. Sibsankar Haldar, Alex A.Aravind, "Operating systems", 2 nd Edition, Pearson Education.
Reference Books	1. Harvey M Deital, "Operating System", Addison Wesley. 2. Tannenbaum, "Operating System", TMH 3. Unleashed Linux by Tech Media Publishers, New Delhi.
e-Learning	• https://www.tutorialspoint.com/operating_system/os_overview.htm https://onlinecourses.swayam2.ac.in/cec20_cs06/preview

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	**Marks**	**Pattern**
Mid Semester	12	**Section A:** Contains **05** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **01 Marks.** **Section B:** Contains **02** descriptive questions and each question carries 2 marks. **Section C:** Contains **04** descriptive questions out of which **03** questions are to be attempted. Each question carries **05 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Quiz Test	04	Contains **04 descriptive questions.** Each question carries **01** Mark.
Assignment	05	Assignment to be made on topics and instruction given by subject teacher
Presentation	05	Presentation to be made on topics and instruction given by subject teacher
Attendance	04	As per policy
Total Marks	**30**	

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ERA University, Lucknow
Department of Computer Science
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Software Engineering**	**Course Code:**	**MCA0103T**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
◉ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational

Course Objectives	1. To understand the essentials of software engineering. 2. To understand the various software development models. 3. To identify the key elements of software design process. 4. To explain the function of each element of a memory hierarchy.
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*	
Course Outcome (CO)	**Attributes**
CO1	Apply theoretical foundation of software engineering in practical software development
CO2	Discuss the software life cycle models
CO3	Identify the importance of the software development process
CO4	Apply software engineering practices to create complex software designs
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 12 Marks Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction to software engineering**: define software engineering, software process, software engineering practices **Software process models**: software development life cycle (SDLC), classical software development lifecycle model, prototyping model, V model, incremental Model, introduction to agile method of software development	**14**	**CO1**
Unit 2	**Requirement engineering**: requirement engineering, requirement eliciting/gathering, negotiating requirement, validating requirement, requirement analysis, stakeholder analysis **Requirement specification**: software requirement specification document, characteristics of a good SRS, functional and non-functional requirement	**16**	**CO2**
Unit 3	**Design**: design process, design concepts, coupling, cohesion, data flow diagram (DFD), flow chart, architectural design, component-based design, object-oriented design, class-based components, use case diagram, class diagram, activity diagram **User interface design**: golden rules, interface design models, interface design process, interface design activities	**15**	**CO3**
Unit 4	**Software testing**: test design, test planning, test case definition, **Testing strategies**: black box testing, white box testing, sanity testing, smoke testing **Testing levels**: unit testing, integration testing, system testing, acceptance testing, regression testing	**15**	**CO4**

	Software maintenance: software maintenance, software supportability, reengineering, business process reengineering, software reengineering, restructuring, economics of reengineering		

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	1	2		1	2	1			
CO2	3	3	3		1	3		1	2	1	1	1
CO3	2	3	2	2	2	2	2	2	2	2	1	1
CO4	2	2	2		2	3		2		3		

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. R. Pressman, "Software Engineering", TMH. 2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa
Reference Books	1. Pankaj Jalote, "Software Project Management in Practice", Pearson Education.
e-Learning	• https://www.tutorialspoint.com/software_engineering/index.htm • https://nptel.ac.in/courses/106105182

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	**Section A:** Contains **05** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **01 Marks.** **Section B:** Contains **02** descriptive questions and each question carries 2 marks. **Section C:** Contains **04** descriptive questions out of which **03** questions are to be attempted. Each question carries **05 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Quiz Test	04	Contains **04 questions.** Each question carries **01** Mark.
Assignment	05	Assignment to be made on topics and instruction given by subject teacher
Presentation	05	Presentation to be made on topics and instruction given by subject teacher
Attendance	04	As per policy
Total Marks	**30**	

Course created by: **Signature:**	**Approved by:** **Signature:**

ERA University, Lucknow
Department of Computer Science
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Computer organization and architecture**	**Course Code:**	**MCA0104T**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
○ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To have a thorough understanding of the basic structure and operation of a digital computer. 2. Remember and understand the basics of computer architecture, organization and Design. 3. An ability to understand the functions of various hardware components and their building blocks 4. In depth understanding of Central Processing Unit & I/O organization.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	Understand the fundaments of a digital computer system.				
CO2	Learn basic computer organization and design.				
CO3	Learn organization of computer memory and access methods.				
CO4	Understand the architecture of a basic computer, its registers, bus system and the interaction flow among them.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 12 Marks Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks				

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Basic of Digital Electronics:** Introduction to logic gates. Primary Gates, Derived gate, Universal Gate, Boolean Algebra, **Logical expression**: Canonical and standard forms, Reducing the SOP/POS expression using Algebraic & K- map methods up to four variables, don't care conditions. **Combinational Logic**: Combinational circuits, binary adder- subtractor, introduction to decoders, encoders, multiplexers, de-multiplexers. **Sequential logic:** Sequential circuits, synchronous and asynchronous, flip flops, RS, D, JK, T, Master slave flip flop.	**18**	**CO1**
Unit 2	**Basic Computer Organization and Design**: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference instructions, input-output and interrupt. **Memory Unit**: Introduction of computer memory classification, Concepts of auxiliary, Associative, Cache And Virtual Memory, **Direct Memory Access (DMA):** Introduction, DMA Transfer modes , sequential access, direct access storage devices.	**15**	**CO2**

Unit 3	**Control Design:** Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Hardwired Control, Micro programmed control (Microinstruction, Microprogram sequencing, Microinstruction with Next-address field, Prefetching Microinstruction).	**15**	**CO3**
Unit 4	**Processor Design**: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, RISC & CICS Architecture. **Input-Output Organization**: I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Programmed I/O, Input-Output processor, Serial Communication.	**12**	**CO4**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	2	2		3	2	3		2	1	1		1
CO2	1	2	2	2	1	2	1	1	2	2	1	
CO3	3	3	2	2	3	2		3	2	2		1
CO4	2	2		3	2	3	1	2	2	1	1	

Strong contribution-3, Average contribution-2 , Low ontribution-1,

Suggested Readings:

Text- Books	1. M. Mano, "Computer System Architecture", Pearson Education, New Jersey, 2017, 3rd Ed. 2. W. Stallings, "Computer Organization and Architecture Designing for Performance", Prentice Hall of India, 2015, Tenth Edition.
Reference Books	1. M. Mano, "Digital Design", Pearson Education, New Jersey, 2018, Sixth Edition.
e-Learning	• https://www.javatpoint.com/digital-electronics • https://onlinecourses.swayam2.ac.in/cec21_cs16/preview

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	**Section A:** Contains **05** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **01 Marks.** **Section B:** Contains **02** descriptive questions and each question carries 2 marks. **Section C:** Contains **04** descriptive questions out of which **03** questions are to be attempted. Each question carries **05 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Quiz Test	04	Contains **04 descriptive questions.** Each question carries **01** Mark.
Assignment	05	Assignment to be made on topics and instruction given by subject teacher
Presentation	05	Presentation to be made on topics and instruction given by subject teacher
Attendance	04	As per policy
Total Marks	**30**	

Course created by: **Signature:**	**Approved by:** **Signature:**

Department of Computer Science
Era University, Lucknow
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Computer Networks**	**Course Code:**	**MCA0105T**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
○ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To build an understanding of the fundamental concepts of computer networking. 2. To familiarize the student with the basic taxonomy and terminology of the computer networking. 3. To get familiar with transmission media and network topologies. 4. To understand the OSI model and its layers.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	Understand basic computer network technology.				
CO2	Understand and explain Data Communications System and its components.				
CO3	Identify the different types of network topologies and protocols.				
CO4	Enumerate the layers of the OSI model and TCP/IP and explain the function(s) of each layer.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 12 Marks Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks				

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction to Computer Networks**: Basics of Computer Networks - Network protocol basics, **Service identification** **Computer Address:** Physical Address - MAC Address, Logical Address - IPv4 Addressing System, IPv6 Addressing System, Subnetting and Super netting **Network requirements**: Network interface card (NIC), **Networking devices** – Hub, Switch, and Routers, repeater.	**18**	**CO1**
Unit 2	**Network Topologies and Network Architectures**: Network Topologies: Bus, Star, Ring, Mesh, Network Architectures: Client/Server Architecture, Peer-To-Peer Architecture. **Open System Interconnect (OSI) Reference Model** - TCP/IP Model - TCP Operation - UDP Operation – Flow Control – Congestion Control.	**15**	**CO2**
Unit 3	**Local Area Networks**: Switching, Packet Switching and Forwarding, LAN Technologies, Ethernet, Token Bus, Token Ring, Wireless LAN, Multiple Access Protocols, **Error-Detection and Correction Techniques:** Parity bit and Hamming code. **Wide Area Networks**: WAN Components – WAN Technologies - WAN Encapsulation - Routing: Static Routing and Dynamic Routing - Routed Protocols (IP and IPX) - Routing Protocols.	**15**	**CO3**

Unit 4	**Protocols**: Address Resolution Protocol (ARP) Protocol - Dynamic Host Configuration Protocol (DHCP)- Domain Name System (DNS) – Internet Protocol (IP) – Internet Control Message Protocol (ICMP) - Hypertext Transfer Protocol (HTTP) - File Transfer Protocol (FTP) - Simple Mail Transfer Protocol (SMTP), Remote Administration Protocols: Telnet and Secure Shell (SSH).	**12**	**CO4**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	2	2		3	2	3		2	1	1		1
CO2	1	2	2	2	1	2	1	1	2	2	1	
CO3	3	3	2	2	3	2		3	2	2		1
CO4	2	2		3	2	3	1	2	2	1	1	

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. B. A. Forouzan, "Data Communication and Networking", Tata McGraw Hill. 2. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.
Reference Books	2. W. Stallings, "Data and Communication", Prentice Hall of India.
e-Learning	• https://www.javatpoint.com/computer-network-tutorial • https://onlinecourses.swayam2.ac.in/cec19_cs07/preview

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	**Section A:** Contains **05** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **01 Marks.** **Section B:** Contains **02** descriptive questions and each question carries 2 marks. **Section C:** Contains **04** descriptive questions out of which **03** questions are to be attempted. Each question carries **05 Marks**. ***50% of the marks obtained in the mid semester examination will be added to the internal assessment.***
Quiz Test	04	Contains **04 descriptive questions.** Each question carries **01** Mark.
Assignment	05	Assignment to be made on topics and instruction given by subject teacher
Presentation	05	Presentation to be made on topics and instruction given by subject teacher
Attendance	04	As per policy
Total Marks	**30**	

Course created by: **Signature:**	**Approved by:** **Signature:**

Department of Computer Science
Era University, Lucknow
Course Outline
Effective from: 2024-25

Name of the Program	**Master of Computer Application (MCA)**			**Year/ Semester:**	**1st / 1st**
Course Name	**Mathematical Methods**	**Course Code:**	**MCAB0101**	**Type:**	**Theory**
Credits	**--**			**Total Sessions Hours:**	**45 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
○ Core	○ Major	○ Minor	○ Elective	○ Co-curricular	○ Vocational
Course Objectives	1. To learn basics of mathematics. 2. To introduce the basic concepts of set theory. 3. To learn Cartesian co ordinate system. 4. To learn central tendency and fundaments of probability.				

Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	Able to calculate rank of matrix, inverse of the matrix & use the concept of matrix to find the solution of system of linear equations.
CO2	Understand the basics of set theory.
CO3	Understand the Cartesian co ordinate system, basic formulae of plane geometry and different forms of equation of straight line.
CO4	Learn the measures of central tendency and basic concepts of probability.
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	**Mid-term Examination: 12 Marks** Attendance: 04 Marks Quiz Test: 04 Marks Assignment: 05 Marks Presentation: 05 Marks

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Definition of different types of matrix**, Algebraic operations, Symmetric & skew symmetric matrix, Transpose of matrix, Orthogonal matrices, Rank of matrix, Determinant of a square matrix, Inverse of a square matrix, Solution of Linear Equations by Cramer's Rule, Eigen values & Eigen vectors of a square matrix.	**14**	**CO1**
Unit 2	**Set Theory:** Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets. Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations. **Functions**: Definition, Classification of functions, Operations on functions, Recursively defined functions.	**16**	**CO2**
Unit 3	Coordinates, Section formula, Distance formula, Slope or gradient of straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slopeintercept form of a straight line, normal form of a straight line.	**12**	**CO3**
Unit 4	Measures of central Tendency – Mean, Median, Mode, Measures of Dispersion-Standard deviation and Coefficient of variance. Probability-Sample space and events, Definition of probability, Elementary properties of probability.	**18**	**CO4**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	2	2	3	2					1	1		
CO2	2	3	3	1	1	3	2	2	2	1	1	1
CO3	3	2	2	3	1	2		1	1	3	1	1
CO4	2	3	3	2		3	1		2	3	1	

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. 12 th N.C.E.R.T. Book. 2. Probability theory and random process by S.P. Eugene Xavier, S. Chand & company Pvt. Ltd 3. Mathematics and statistics by Ajay Goyal, Taxman Allied Service Pvt. Ltd.
Reference Books	1. Differential calculus by Shanti Narayan, S. Chand.
e-Learning	• https://nptel.ac.in/courses/122104018/ • https://nptel.ac.in/courses/111104085

Recapitulation & Examination Pattern

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Presentation	05	Presentation to be made on topics and instruction given by subject teacher
Attendance	04	As per policy
Total Marks	**30**	