

**NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)**



Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW



Evaluation Scheme & Syllabus

For

Master of Computer Applications (MCA)

First Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

MCA
Evaluation Scheme
SEMESTER I

Sl. No.	Subject Codes	Subject Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DMCA0101	Computer System & Organization	Mandatory	3	0	0	30	20	50		100		150	3
2	DMCA0102	Programming in C	Mandatory	3	0	0	30	20	50		100		150	3
3	DMCA0103	Operating Systems	Mandatory	3	0	0	30	20	50		100		150	3
4	DMCA0104	Discrete Mathematics	Mandatory	3	1	0	30	20	50		100		150	4
5	DMCA0105	Workplace Communication Competence 1	Mandatory	3	0	0	30	20	50		100		150	3
6	DMCA0151	Computer System & Organization Lab	Mandatory	0	0	2				50		50	100	1
7	DMCA0152	Programming in C Lab	Mandatory	0	0	4				50		50	100	2
8	DMCA0153	Operating Systems Lab	Mandatory	0	0	4				50		50	100	2
9	DMCA0155	Workplace Communication Competence 1- Lab	Mandatory	0	0	4				50		50	100	2
10	DMCA0159	AI and Prompt Engineering Lab	Mandatory	0	0	4				50		50	100	2
11		*Massive Open Online Courses MOOCs	*MOOCs											
		TOTAL		15	1	18	150	100	250	250	500	250	1250	25

First Semester Bridge Course (for the students of non-computing background):

Course Code	Course Type	Course Title
DMCABC0101	Bridge	Computers Concepts & Emerging Technologies

List of MOOCs Based Recommended Courses for First Year (Semester-I) MCA Students

Sr. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours
1	DMC0015	Programming Fundamentals using Python - Part 1	IIHT	43h 25m
2	DMC0016	Linux for Beginners	Infosys Wingspan (Infosys Springboard)	6h 2m

Abbreviation Used:

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam.,
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA**(An Autonomous Institute)****MCA****Evaluation Scheme****SEMESTER II**

Sl. No	Subject Codes	Subject Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DMCA0201	Cognitive Ability	Mandatory	2	1	0	30	20	50		50		100	3
2	DMCA0202	Database System	Mandatory	3	0	0	30	20	50		100		150	3
3	DMCA0203	Data Structures	Mandatory	3	0	0	30	20	50		100		150	3
4	DMCA0204	Design Thinking – I	Mandatory	3	0	0	30	20	50		100		150	3
5		Departmental Elective-I	Departmental Elective	3	0	0	30	20	50		100		150	3
6	DMCA0252	Database System Lab	Mandatory	0	0	4				50		50	100	2
7	DMCA0253	Data Structures Lab	Mandatory	0	0	4				50		50	100	2
8	DMCA0255	Object Oriented Techniques using JAVA	Mandatory	0	0	6				50		100	150	3
9		Departmental Elective-I Lab	Mandatory	0	0	2				25		25	50	1
10	DMCA0257	Workplace Communication Competence 2 Lab	Mandatory	0	0	4				50		50	100	2
11		*Massive Open Online Courses MOOCs	*MOOCs											
		TOTAL		14	1	20	150	100	250	225	450	275	1200	25

*** List of MOOCs Based Recommended Courses for First Year (Semester-II) MCA Students**

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours
1	DMC0017	Data Structures & Algorithms	Infosys Wingspan (Infosys Springboard)	18h 5m
2	DMC0005	Next Gen Technologies	Infosys Wingspan (Infosys Springboard)	10h 14m

Abbreviation Used:

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam.,
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

List of Department Elective (if any): -

S. No.	Subject Codes	Subject Name	Type of Subject	Bucket Name	Applicable Branch	Semester
1	DMCA0211	CRM Administration	Departmental Elective-1	CRM	MCA	II
2	DMCA0212	Fundamentals of Digital Marketing and Analytics	Departmental Elective-1	Data Analytics	MCA	II
3	DMCA0213	Machine Learning	Departmental Elective-1	AI-ML	MCA	II
4	DMCA0211P	CRM Administration Lab	Departmental Elective-1 Lab	CRM	MCA	II
5	DMCA0212P	Fundamentals of Digital Marketing and Analytics Lab	Departmental Elective-1 Lab	Data Analytics	MCA	II
6	DMCA0213P	Machine Learning Lab	Departmental Elective-1 Lab	AI-ML	MCA	II

Course Code: DMCA0101			Course Name: Computer System & Organization					L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)								3	0	0	3
Pre-requisite of Subject: Basic Knowledge of Mathematics and Computer Fundamentals											
Course Objective:											
The basic concepts and components of digital logic design, the different methods of data representation in computers, Combinational and Sequential circuits, the different micro-operations, and data transfer methods. Understand the design, functionality and taxonomy of CPU, Memory types, the I/O interface, I/O ports, modes of data transfer between CPU and I/O device, 8085 microprocessors											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Apply the concept of number systems, logic gates, Boolean algebra, Minimization techniques								K3		
CO2	Define the concept of combinational and sequential circuits.								K2		
CO3	Discuss the concept of Register, the working of bus and memory transfer and ALU.								K2		
CO4	Describe the hierarchical memory system, cache memory and Input/output interface and modes of data transfer.								K2		
CO5	Discuss the 8085- microprocessor architecture, addressing modes, instruction cycle and formats.								K2		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	2	2	-	-	-	2		
CO2		3	2	2	2	-	-	-	1		
CO3		3	2	2	2	-	-	-	1		
CO4		2	2	2	2	-	-	-	1		
CO5		3	2	2	2	-	-	-	2		
Course Contents / Syllabus											
Unit 1			INTRODUCTION TO NUMBER SYSTEM, BOOLEAN ALGEBRA							9 hours	
Digital Computers and Number System, Complements, Logic Gates, Boolean Algebra, Map Simplification up to Five variables, Data types, Fixed point representation, Fixed Point Addition & Subtraction, floating point Representation, Booth's Multiplication, IEEE754 Floating point standards.											
Unit 2			INTRODUCTION TO COMBINATIONAL CIRCUITS AND SEQUENTIAL CIRCUITS							9 hours	
Combinational Circuits – Code Converter, Half Adder, Full Adder, Half Subtractor, Full subtractor, MUX, DEMUX, Encoder and Decode Sequential Circuits – Latch and Flip Flop – S-R, D, J-K and T, Shift Registers											
Unit 3			REGISTER TRANSFER AND ALU DESIGN							9 hours	
Register Transfer Language, Register Transfer, Bus and Memory Transfers, Common Bus System, Two Bus Organization, three-bus organization. Arithmetic & Logic unit design, RISC & CISC Architecture											
Unit 4			MEMORY MANAGEMENT AND INPUT/OUTPUT							9 hours	
Memory Hierarchy, Main Memory (RAM and ROM chips), Associative memory, Cache Memory. I/O interface, I/O ports, Interrupts, Modes of data Transfer: Programmed I/O, Interrupt Initiated I/O, and Direct memory access (DMA)											
Unit 5			8085 MICROPROCESSORS							9 hours	

8085: Architecture, General register Organization, Stack Organization, pin diagram, Addressing modes, Instruction formats, instruction cycles and sub cycles (Fetch, decode, execute etc.), Instructions- Data Transfer, Arithmetic, Logical, Branch and Assembly language programming		
		Total Lecture Hours 45 hours
Textbook:		
		Authors Name
1.Computer System Architecture, Pearson, 2012		M. Morris Mano
2.Digital Design Techniques and Exercises: A Practice Book for Digital Logic Design, Springer Nature Singapore, 2021		Vaibbhav Taraate
Reference Books:		
		Authors Name
1. Structured Computer Organization, Pearson, 2012		Andrew S.,Tanenbaum
2. Computer Organization and Architecture, Pearson, 2015		William Stallings
3. Microprocessor Architecture, Programming and Applications with the 8085, Penram International Publishing, 2000		R. S. Gaonkar
Self-Study Content Links:		Duration (in Hrs)
MOOCs	http://coursera.org/learn/introduction-to-computer-organization	13 Hrs
	https://www.coursera.org/learn/codio-intro-to-operating-systems-2-memory-management	9 Hrs
Video Lectures	https://www.youtube.com/watch?v=7TQS3ZcCFg8 https://www.youtube.com/watch?v=EW_2MhFu7tE https://www.youtube.com/watch?v=P73P0oBSDPw https://www.youtube.com/watch?v=eESIFJz7mJw https://www.youtube.com/watch?v=-Q99XiiKfXg	1 Hrs 33 Min 21 Min 38 Sec 35 Min 49 Sec 23 Hrs 40 Sec 21 Hrs 07 Sec
Web References	https://www.geeksforgeeks.org/booths-multiplication-algorithm/ https://www.geeksforgeeks.org/multiplexers-in-digital-logic/ https://www.tutorialspoint.com/computer_logical_organization/register_transfer_and_microoperations.htm https://nptel.ac.in/courses/106106166 https://www.youtube.com/@nesoacademy	

Course Code: DMCA0102			Course Name: Programming in C			L	T	P	C
Course Offered in: MCA 1st Year (1st Semester)						3	0	0	3
Pre-requisite: Basic knowledge of computers									
Course Objectives:									
The objective of a C programming course is to provide students with a solid foundation in the C programming language. The course aims to familiarize students with the syntax, concepts, and principles of C programming, as well as develop their ability to write efficient and effective C code.									
Course Outcome: After completion of the course, the student will be able to						Bloom's Knowledge Level (KL)			
CO1	Apply the fundamentals of C programming to recognize tokens, operators, data types in developing basic C programs.					K3			
CO2	Implement control structures, loops, functions, recursion, and storage classes to develop structured C programs solving basic computational problems.					K4			
CO3	Apply pointers, arrays, and string manipulations to perform memory-efficient operations and solve problems using modular C programming techniques.					K4			
CO4	Develop programs using structures, unions, and dynamic memory allocation to handle complex data and optimize memory usage in C.					K4			
CO5	Implement file handling, sorting, searching, and command-line argument techniques to manage data input/output efficiently in C programs.					K4			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	2	2	1	1	-	1	
CO2	3	3	2	3	2	1	-	2	
CO3	3	3	3	3	2	2	-	2	
CO4	3	2	3	3	2	2	-	2	
CO5	3	3	3	3	3	3	-	3	
Course Contents / Syllabus									
Unit 1		BASIC CONCEPTS OF C PROGRAMMING						9 hours	
Introduction to Algorithm and C Program: Programming using C: Concepts of Algorithm and Flowchart, Translator and its types Applications of C programming, Structure of C program, Overview of compilation and execution process in an IDE, Transition from algorithm to program, Syntax, logical errors and Run time errors, object and executable code Tokens & Operators: Keywords, identifiers, constant, Operators and their types, Arithmetic expressions and precedence: Operators precedence and associativity, type conversion, mixed operands. Data Types & Variables: Basic data types, type modifiers, variable declaration, memory allocation									
Unit 2		CONTROL STRUCTURES AND FUNCTIONS						9 hours	
Conditional Branching: if, else-if, nested if - else, switch statements, use of break, and default with switch Iteration and loops Concept of loops, for, while and do- while, multiple loop variables, use of break and continue statements, nested loop Functions Concept of Sub-programming, function, types of functions, passing parameters to functions: call by value Definition Recursion Definition, Types of recursive functions, Tower of Hanoi problem Storage Classes: scope of variable, local and global variables, Nesting of Scope, Auto, Register, Static and Extern									
Unit 3		ARRAY AND POINTERS						9 hours	
Pointers: Defining and declaring pointer, pointer arithmetic and scaling, Pointer Aliasing. call by reference									

Arrays: Array notation and representation (one and two dimensional), array using pointers, manipulating array elements, 2-D arrays used in matrix computation. Sorting and searching algorithms

Strings: Introduction, initializing strings, accessing string elements, Array of strings, Passing strings to functions, String manipulation functions.

Unit 4	DERIVED DATA TYPES AND MEMORY MANAGEMENT	9 hours
---------------	---	----------------

Structure: Introduction, Initializing, defining, and declaring structure, accessing members, Operations on individual members, Operations on structures, Structure within structure, Array of structure

Union: Introduction, Initializing, defining, and declaring structure, Accessing members, Operations on individual members, Operations on Union, Difference between Structure and Union

Dynamic Memory Allocation: Introduction, Library functions– malloc (), calloc(), realloc() and free()

Unit 5	FILE MANAGEMENT	9 hours
---------------	------------------------	----------------

File Handling: File Types, File operations, File pointer, File opening modes, File handling functions, Command Line Arguments, File handling through command line arguments, Record I/O in files

Total Lecture Hours	45 hours
----------------------------	-----------------

Textbook:

	Authors Name
1.C: The Complete Reference, McGraw-Hill, 2000	Herbert Schildt
2.Programming in ANSI C, 9th Edition, McGraw-Hill Education India, 2024	E. Balagurusamy
3.Let Us C, 20th Edition, BPB Publications, 2024	Yashavant P. Kanetkar

Reference Books:

	Authors Name
1. Modern C, Third Edition, Manning Publications, 2023	Jens Gustedt
2. Head First C: A Brain-Friendly Guide, O'Reilly Media, 2012	David Griffiths & Dawn Griffiths
3. C Programming in Easy Steps, In Easy Steps Limited, 2022	Mike McGrath

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	8 Hrs 45 Min
	17 Hrs 7 Min
Video Lectures	6 Hrs 53 Min
	1 Hrs 2 Min
	25 Min 04 Sec
	19 Min 49 Sec
	13 Min 05 Sec
Web References	

Course Code: DMCA0103			Course Name: Operating Systems			L	T	P	C
Course Offered in: MCA 1st Year (1st Semester)						3	0	0	3
Pre-requisite: Students are expected to be familiar with Computer Organization									
Course Objectives:									
Objective of this course is to provide an understanding of the basic structure and functions of an operating system and deliver the skills needed to develop Unix/Linux shell programs.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)	
CO1	Describe operating system concepts, functions, and design CPU Scheduling algorithms							K2	
CO2	Analyze the issues related to inter-process communication, like Synchronization and Deadlocks.							K4	
CO3	Describe the concepts of Memory Management and Implement disk scheduling algorithms.							K2	
CO4	Design and use Linux utilities to create and manage simple file processing operations.							K5	
CO5	Implement shell scripts to perform more complex tasks in shell programming environment.							K5	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	2	2	-	-	-	1	
CO2	3	3	2	2	-	-	-	2	
CO3	3	2	2	2	-	-	-	1	
CO4	2	2	3	3	2	1	-	2	
CO5	2	2	3	3	2	1	-	3	
Course Contents / Syllabus									
Unit 1		FUNDAMENTAL CONCEPTS OF OPERATING SYSTEM							10 hours
Fundamentals of Operating Systems: Operating System, Operating System characteristics, Functions of Operating Systems, Types of Operating System, Layered Structure, System call, Kernel, Multiprogramming and Multitasking, Overview of Windows OS, Unix/Linux OS. Process Management: Process Management: Process Concepts, State Transition Diagram. Types of Schedulers: Long Term, Mid Term, Short Term, Process Control Block, Inter-process communication CPU Scheduling: CPU Scheduling Criteria, Pre-emptive and Non-Pre-emptive Scheduling, Scheduling Algorithm: FCFS, SJF, SRTF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling and Multilevel Feedback Queue Scheduling, Context Switching									
Unit 2		PROCESSES AND DEADLOCK							8 hours
Process Synchronization: Critical Section problem & their solutions, Introduction to Semaphores, Classical Problems of Synchronization (Producer Consumer Problem, Readers Writer Problem, Dining philosophers' problem) Deadlocks: Characterization, Deadlock concepts & Handling Techniques (Prevention and Detection & Recovery), Deadlock Avoidance: Banker's Algorithm.									
Unit 3		MEMORY MANAGEMENT							10 hours
Memory Management: Background, Swapping, Contiguous and Non-Contiguous memory allocation, Paging, Segmentation, Segmentation with paging. Virtual Memory: Background, Demand paging, Allocation of frames: First Fit, Best Fit, and Worst Fit, Page replacement algorithms (FCFS, Optimal, LRU), Balady's Anomaly, Thrashing. Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, and C-LOOK File Management System: Concept and Organization, Access Methods, File System Implementation, Allocation Methods, Free Space Management, File System Security and Protection									

Unit 4	LINUX ADMINISTRATION	8 hours
Linux administration: Linux Components, Shells, Installation of Linux, Virtualization: Definition, Types, Advantages, Virtualization tools. User Administration, Files: Type, Ownership, Permissions, and Manipulation Commands: Internal and External, Directory and File commands, I/O commands, Pipes, Filters, and shell commands. System Admin: man, uptime, users, service, ps		
Unit 5	SHELL PROGRAMMING AND VI EDITOR	9 hours
Shell Programming & VI Editor: Shell Programming - shell script features, shell variables, writing and executing a shell script, positional parameters. Introduction to VI editor, VI editor Models, Invoking VI editor, Configuring the vi environment, the process - parent and child process, process creation, process related commands, branching control structures- if, case, etc., Loop control structures- while, until, for, etc., Jumping control structures – break, continue, exit, etc., Integer and Real arithmetic in shell programs		
Total Lecture Hours		45 hours
Textbook:		
		Authors Name
1. Operating System Concepts Essentials, Wiley, 2012		Abraham Silberschatz, Peter Baer Galvin, Greg Gagne
2. Modern Operating Systems, Pearson, 2014		Andrew S. Tanenbaum, Herbert Bos
Reference Books:		
		Authors Name
1. Operating Systems: Internals and Design Principles, Pearson, 2014		William Stallings
2. Operating System: A Design-Oriented Approach, McGraw-Hill, 1997		Charles Crowley
3. Operating Systems: A Modern Perspective, Pearson, 2014		Gary J. Nutt
4. Design of the UNIX Operating Systems, Prentice Hall, 1986		Maurice J. Bach
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0138417201182392322201_shared/overview	6 Hrs 2 Min
	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384779898861158454218_shared/overview	3 Hrs 11 Min
Video Lectures	https://www.youtube.com/watch?v=jK5Mh6d9HiE	53 Min 56 Sec
	https://www.youtube.com/watch?v=_IxqinTs2Yo	50 Min 29 Sec
	https://www.youtube.com/watch?v=TF_KP4SMIfM	58 Min 51 Sec
	https://www.youtube.com/watch?v=akU1Ji8Vzdk	1 Hrs 4 Min
	https://www.youtube.com/watch?v=48zApVSX97s	19 Min 20 Sec
Web References	https://www.geeksforgeeks.org/operating-systems/	



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



	https://www.geeksforgeeks.org/operating-systems/process-synchronization-in-operating-system/ https://www.geeksforgeeks.org/operating-systems/memory-management-in-operating-system https://ubuntu.com/server/docs/ https://tldp.org/LDP/Bash-Beginners-Guide/html/	
--	--	--

Course Code: DMCA0104			Course Name: Discrete Mathematics				L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)							3	1	0	4
Pre-requisite: Basic Knowledge of Mathematics										
Course Objectives:										
The course develops mathematical reasoning and analytical thinking through the study of discrete mathematical structures such as sets, relations, functions, graphs, and algebraic systems. It enables students to apply logic, combinatorics, counting techniques, and recurrence relations to solve problems and support computer science applications.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Use Mathematical and logical notation to define basic discrete structures such as Sets, Relation Functions, and Inductions							K2		
CO2	Analyze and Apply Concepts of posset, Graphs, and Trees							K4		
CO3	Identify and prove properties of Algebraic Structures and their applications							K4		
CO4	Apply Propositional and predicate logic for logical Reasoning							K3		
CO5	Solve Recurrence Relations and Apply Combinatorics Techniques							K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	-	2	-	-	-	1		
CO2	3	3	2	1	-	-	-	2		
CO3	3	3	2	2	1	-	-	2		
CO4	3	3	2	2	-	-	-	2		
CO5	3	2	2	3	-	-	-	2		
Course Contents / Syllabus										
Unit 1		SET THEORY, RELATIONS & FUNCTIONS							12 hours	
Set Theory: Introduction, Size of sets and cardinals, Venn diagrams, Combination of sets, Multisets, ordered pairs, Set identities and Proofs of some general identities on sets.										
Relations & Functions: Definition, Operations on relations, Composite relations, Properties of relations, Equality of relations, Partial order relation, and Recursive definition of relation. Functions - Definition, Classification of functions, Operations on functions, recursively defined functions, and Growth of Functions.										
Natural Numbers: Introduction, Pano's axioms, Mathematical Induction, Strong Induction, and Induction with Nonzero Base Cases.										
Unit 2		POSSETS, HASSE DIAGRAM, LATTICES AND GRAPH							12 hours	
Possets, Hasse Diagram and Lattices: Introduction, Partial order sets, Combination of partial order sets, Hasse diagram, Introduction of lattices, Properties of lattices – Bounded, Complemented, Modular and Complete lattice.										
Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring										
Trees: Definition, Binary tree, Binary tree traversal (BFS and DFS), Binary search tree.										
Unit 3		ALGEBRAIC STRUCTURES, RINGS AND FIELDS							14 hours	
Algebraic Structures: Introduction to algebraic Structures and properties. Types of algebraic structures: Semigroup, Monoid, Group, Abelian group, and Properties of a group. Subgroup, Cyclic group, cosets, Permutation and Symmetric groups, Homomorphism, and Isomorphism of groups.										
Rings and Fields: Definition and elementary properties of Rings and Fields										
Unit 4		PROPOSITIONAL & PREDICATE LOGIC							10 hours	
Propositional & Predicate Logic: Propositions well-formed formula, Truth tables, Tautology, Contradiction, Algebra of propositions, Theory of Inference, and Natural Deduction.										
Predicate Logic: Theory of predicates, Predicate formulas, Quantifiers, Inference theory of predicate logic										
Unit 5		RECURRENCE RELATIONS & COMBINATORICS							12 hours	
Recurrence Relations and Generating Function: Introduction and properties of Generating Function, Growth of functions,										

Recurrences from algorithms, Simple Recurrence relation with constant coefficients and Linear recurrence relation without constant coefficients. Methods of solving recurrences

Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle, Pólya's Counting Theory.

Total Lecture Hours **60 hours**

Textbook:

	Authors Name
1. Discrete Mathematics and Its Applications, McGraw-Hill, 2006	Kenneth H. Rosen
2. Discrete Mathematical Structures, Prentice Hall, 2004	B. Kolman, R. C. Busby, and S. C. Ross

Reference Books:

	Authors Name
1. Discrete and Combinatorial Mathematics: An Applied Introduction, Pearson Education, 2003	Ralph P. Grimaldi
2. Discrete Mathematical Structures, Pearson Education, 2008	Bernard Kolman, Robert C. Busby, and Sharon Cutler Ross
3. Numerical Methods in Engineering and Science, Khanna Publishers, 2014	B. S. Grewal

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01350157110661939210352/overview https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01350158234219315211804/overview 56 Min 47 Min
Video Lectures	https://www.youtube.com/watch?v=7k4Di5u-oUU&list=PL0862D1A947252D20&index=12 https://www.youtube.com/watch?v=oU60TuGHxe0&list=PL0862D1A947252D20&index=11 https://www.youtube.com/watch?v=_BIKq9Xo_5A&list=PL0862D1A947252D20&index=13 https://www.youtube.com/watch?v=Yk6-ZBb9vh4 https://www.youtube.com/watch?v=4V30R3I1vLI 58 Min 21 Sec 53 Min 19 Sec 57 Min 57 Sec 46 Min 02 Sec 13 Min 42 Sec
Web References	https://www.tutorialspoint.com/discrete_mathematics/index.htm?utm https://www.geeksforgeeks.org/dsa/graph-data-structure-and-algorithms/ https://open.umh.edu/opentextbooks/subjects/mathematics https://www.mathsisimple.com/discrete-mathematics/propositional-logic https://www.khanacademy.org/math/statistics-probability/counting-permutations-and-combinations

Course Code: DMCA0105			Course Name: Workplace Communication Competence 1					L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)								3	0	0	3
Pre-requisite: Comprehension of the basic English language											
Course Objectives:											
To improve proficiency in the English language to the lower intermediate level of CEFR (Common European Framework of Reference). To impart business communication skills, to motivate students to look within and create a better version of ‘self,’ and to introduce the key concepts of ethics, etiquette, and life skills.											
Course Outcome: After completion of the course, the student will be able to								Bloom’s Knowledge Level (KL)			
CO1	Identify key concepts of life skills.							K3			
CO2	Develop effective listening skills.							K3			
CO3	Compose clear and concise statements on a variety of subjects.							K6			
CO4	Understand and analyze simple written texts.							K4			
CO5	Demonstrate clarity while writing.							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		2	2	-	-	2	-	2	3		
CO2		2	2	-	-	3	-	-	3		
CO3		3	2	2	2	3	-	-	2		
CO4		2	3	-	2	2	-	-	2		
CO5		3	2	-	2	3	-	-	2		
Course Contents / Syllabus											
Unit 1			INTRODUCTION TO COMMUNICATION							9 hours	
Module1.1: Importance of communicating in English Module1.2: Basics of workplace communication Module1.3: Levels of communication Module1.4: Barriers to effective communication											
Unit 2			ART OF LISTENING							9 hours	
Module2.1: Developing listening skills Module2.2: Active and Passive Listening Skills Module2.3: Empathetic listening											
Unit 3			SPEAKING TO EXPRESS							9 hours	
Module 3.1: Effective Speaking: A Key to Professional Success Module 3.2: Etiquette & Ethics Module 3.3: Non-Verbal Cues: Making Verbal delivery effective Module 3.4: Group Discussion – Dos and Don’ts											
Unit 4			READING WITH COGNITIVE SKILLS							9 hours	
Module 4.1: Levels of comprehension Module 4.2: Critical reading Module 4.3: Acquiring vocabulary & sentence structure from texts											
Unit 5			HARNESSING WRITING SKILLS							9 hours	

Module 5.1: Honing the writing skills

Module 5.2: Workplace vocabular

Module 5.3: Pauses in written documents

Total Lecture Hours | **45 hours**

Textbook:

	Authors Name
1. Technical Communication – Principles and Practices	Meenakshi Raman & Sangeeta Sharma
2. ABC Workbook, NIET Publishing House	NIET Publishing House

Reference Books:

	Authors Name
1. Cambridge English Business Benchmark (Pre-intermediate to Intermediate)	Norman Whitby
2. Technical Communication: A Practical Guide	William S. Pfeiffer and Kaye A. Adkins
3. The Essentials of Technical Communication	Elizabeth Tebeaux and Sam Dragga
4. Listening in the Language Classroom	John Field
5. Speaking: Second Language Acquisition, from Theory to Practice	William Littlewood
6. Second Language Writing in Transitional Spaces: Teaching and Learning Across Languages and Cultures	Viniti Vaish and Guangwei Hu

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	https://www.coursera.org/learn/wharton-communication-skills https://www.coursera.org/learn/careerdevelopment https://www.futurelearn.com/courses/contemporary-communication-strategies-for-the-modern-workplace
Video Lectures	https://www.youtube.com/playlist?list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH https://www.youtube.com/watch?v=0HHdBcGSzT0 https://www.youtube.com/playlist?list=PLrpK1inhO61X_ZfHMjPkYq7R09r1R255j https://archive.nptel.ac.in/courses/109/104/109104126/ https://www.youtube.com/playlist?list=PLrpK1inhO61Wb4eGBX09XpM0lfoZbxuGg



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



Web References	https://learnenglish.britishcouncil.org https://www.bbc.co.uk/learningenglish https://www.toastmasters.org https://owl.purdue.edu https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/workplace_writers.html	
----------------	---	--

LAB Course Code: DMCA0151				LAB Course Name: Computer System & Organization Lab				L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)								0	0	2	1
Pre-requisite: Basic Knowledge of Mathematics and Computer Fundamentals											
Course Objectives: Students will gain practical experience with designing and implementing concepts of gates, multiplexers, Flip Flops, 8085 microprocessors											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Design and verify a logic gate							K3			
CO2	Design, verify, and implement combinational circuits: Half adder, Full adder, Half subtractor, Full subtractor, Code converter							K3			
CO3	Design and implement Decoder, Multiplexer							K3			
CO4	Demonstrate the working of flip-flops							K2			
CO5	Demonstrate the working of 8085 microprocessor							K2			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	1	-	-	1			
CO2	3	2	3	3	1	1	-	1			
CO3	3	2	3	3	1	-	-	1			
CO4	3	2	2	3	1	-	-	1			
CO5	3	2	2	3	1	1	1	2			
List Of Practical's (Indicative & Not Limited To)											
S.No	Name of Experiments/ Programs								CO		
1	Verification of the functionality of all logic gates.								CO1		
2	Implementing HALF ADDER, FULL ADDER using basic logic gates.								CO2		
3	Implementing HALF SUBTRACTOR, FULL SUBTRACTOR using basic logic gates.								CO2		
4	Implementing Binary -to -Gray, Gray -to -Binary code conversions.								CO2		
5	Implementing a 3–8-line DECODER.								CO3		
6	Implementing 4x1 and 8x1 MULTIPLEXERS.								CO3		
7	Verify the excitation tables of various FLIP-FLOPS.								CO4		
8	Introduction of the 8085 microprocessors.								CO5		
9	Write a program to add two 8-bit hexadecimal numbers in an 8085 microprocessor.								CO5		
10	Write a program to subtract two 8-bit hexadecimal numbers in an 8085 microprocessor.								CO5		
Total Hours: 15 hrs											

LAB Course Code: DMCA0152			LAB Course Name: Programming in C					L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)								0	0	4	2
Pre-requisite: Basic knowledge of computers											
Course Objectives:											
The objective of a C programming course is to provide students with a solid foundation in the C programming language. The course aims to familiarize students with the syntax, concepts, and principles of C programming, as well as develop their ability to write efficient and effective C code.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Implement and trace the execution of conditional and iterative programs.							K3			
CO2	Demonstrate use of arrays, strings, functions, and recursion.							K3			
CO3	Solve the complex problem by using an array and a structure.							K3			
CO4	Compare and contrast the structure and union, along with concepts of dynamic memory allocation							K4			
CO5	Apply the concepts of File Handling							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO \ PO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	2	2	1	1	1	1		
CO2		3	3	2	2	2	1	1	2		
CO3		3	3	3	3	2	2	1	2		
CO4		3	2	3	3	2	2	1	2		
CO5		3	3	3	3	2	2	1	3		
List Of Practical's (Indicative & Not Limited To)											
S.No	Name of Experiments/ Programs									CO	
1	Write a C program that simulates a simple calculator capable of performing basic arithmetic operations									CO1	
2	Develop a calculator application that performs conversions between different number systems									CO1	
3	Write a program in C to evaluate the given polynomial equation									CO1	
4	Write a program (write a program) in C to calculate pow (x,n)									CO1	
5	Write a program in C to find largest number among three numbers									CO2	
6	Write a program in C to find roots of a quadratic equation									CO2	
7	Write a program in C to check leap year. Evaluate all the cases									CO2	
8	Write a program in C to check whether a number is positive or negative									CO2	
9	Write a program in C to check whether a character is an alphabet or not									CO2	
10	Write a program in C to make a simple calculator using switch...case									CO2	
11	Write a program in C to check whether a number is even or odd									CO2	
12	Write a program in C to check whether a character is a vowel or a consonant									CO2	

13	Write a program in C to find the largest number among three numbers	C02
14	Write a program in C to check whether a number is positive or negative	C02
15	Write a program in C to calculate the sum of natural numbers	C02
16	Write a program in C to find the factorial of a number	C02
17	Write a program in C to generate a multiplication table	C02
18	Write a program in C to display the Fibonacci sequence	C02
19	Write a program in C to find the GCD of two numbers	C02
20	Write a program in C to find the LCM of two numbers	C02
21	Write a program in C to display characters from a to z using a loop	C02
22	Write a program in C to reverse a number using looping concepts	C02
23	Write a program in C to check whether a number is a palindrome or not	C02
24	Write a program in C to check whether a number is prime or not	C02
25	Write a program in C to check an Armstrong number	C02
26	Write a program in C to display Armstrong numbers between two intervals	C02
27	Write a program in C to display the factors of a number	C02
28	Write a program in C to calculate the sum of natural numbers	C02
29	Write a program in C to find the factorial of a number	C02
30	Write a program in C to convert a binary number to decimal and vice versa	C02
31	Write a program in C to display a diamond-shaped pattern	C02
32	Write a program in C to display Floyd's triangle	C02
33	Write a program in C to display the Pascal triangle	C02
34	Write a program in C to print star patterns	C02
35	Write a program in C to print pyramid patterns	C02
36	Write a C program that performs grade calculation for multiple students	C02
37	Design a C program with a hierarchical menu system for geometric calculations	C02
38	Write a program in C to display prime numbers between intervals using a function	C02
39	Write a program in C to check whether a number can be expressed as the sum of two prime numbers	C02
40	Write a program in C to check prime or an Armstrong number using a user-defined function	C02
41	Develop a menu-driven C program to manage student records	C02
42	Write a program in C to find the sum of natural numbers using recursion	C02

43	Write a program in C to find the factorial of a number using recursion	C02
44	Write a program in C to find the GCD using recursion	C02
45	Write a program in C to calculate the power using recursion	C02
46	Write a program in C to find the sum of natural numbers using recursion	C02
47	Write a program in C to add two numbers using recursion	C02
48	Write a program in C to find the sum of the digits of a number using recursion	C02
49	Write a program in C that will remove any given character from a string	C03
50	Write a program in C to find the frequency of characters in a string	C03
51	Write a program in C to count the number of vowels, consonants, and so on	C03
52	Write a program in C to remove all characters in a string except the alphabet	C03
53	Write a program in C to find the length of a string	C03
54	Write a program in C to concatenate two strings	C03
55	Write a program in C to copy a string without using strcpy ()	C03
56	Write a program in C to sort elements in lexicographical order (dictionary order)	C03
57	Write a program in C to find the frequency of characters in a string	C03
58	Write a program in C to count the occurrences of a given character in a string	C03
59	Write a program in C to check if two strings are anagrams	C03
60	Write a program in C to check whether a string is a palindrome or not	C03
61	C program to check given character is a vowel or a consonant	C03
62	Write a program in C program to check given character is a digit or not	C03
63	Write a program in C program to replace the string spaces with a given character	C03
64	Write a program in C program to convert lowercase char to uppercase in a string	C03
65	Write a program in C program to convert lowercase vowels to uppercase in a string	C03
66	Write a program in C program to delete vowels in each string	C03
67	Write a program in C program to count the occurrence of vowels & consonants in a string	C03
68	Write a program in C program to print the highest frequency character in a string	C03
69	Write a program in C program to replace the first occurrence of a vowel with '-' in a string	C03
70	Write a program in C program to count the number of alphabets, digits, and special characters	C03
71	Write a program in C program to separate characters in each string	C03
72	Write a program in C program to remove blank spaces from a string	C03

73	Write a program in C program to count blank space from string	C03
74	Write a program in C program to concatenate two strings	C03
75	Write a program in C program to remove repeated characters from a string	C03
76	Write a program in C program to calculate the sum of integers in a string	C03
77	Write a program in C program to print all non-repeating characters in a string	C03
78	Write a program in C program to copy one string to another string	C03
79	Write a program in C program to sort the characters of a string	C03
80	Write a program in C program to sort the characters of a string in descending order	C03
81	Write a program in C to calculate the average using arrays	C03
82	Write a program in C to find the largest element in an array	C03
83	Write a program in C to search for an element in a given array	C03
84	Write a program in C to add two matrices using multi-dimensional arrays	C03
85	Write a program in C to multiply two matrices using multi-dimensional arrays	C03
86	Write a program in C to find the transpose of a matrix	C03
87	Write a program in C to access array elements using pointers	C03
88	Write a program in C to find the largest number using dynamic memory allocation	C03
89	Write a program in C to calculate the average using arrays	C03
90	Write a program in C to find the largest element in an array	C03
91	Given an array containing numbers from 1 to 100 with one number missing, write a C program to find the missing number efficiently	C03
92	Given an array containing numbers from 1 to 100, where multiple numbers may be duplicated, write a C program to identify and display all the duplicate numbers	C03
93	Write a program in C to remove duplicate elements from an array in C	C03
94	Write a C program to find and display the numbers that appear in Array 1 but are not present in Array 2	C03
95	Write a program in C for, how to compare two array is equal in size or not	C03
96	Write a program in C to find the largest and smallest numbers in an array	C03
97	Write a program in C to find the second highest number in an integer array	C03
98	Write a program in C to find the top two maximum numbers in an array	C03
99	Write a C program to print an array in reverse Order	C03
100	Write a C program to reverse an Array in two ways	C03
101	Write a C Program to calculate the length of an array	C03
102	Write a C program to insert an element at the end of an Array	C03

103	Write a C program to insert element at a given location in Array	C03
104	Write a C Program to delete element at end of Array	C03
105	Write a C Program to delete given element from Array	C03
106	Write a C Program to delete element from array at given index	C03
107	Write a C Program to find sum of array elements	C03
108	Write a C Program to print all even numbers in array	C03
109	Write a C Program to print all odd numbers in array	C03
110	Write a C program to perform left rotation of array elements by two positions	C03
111	Write a C program to perform right rotation in array by 2 positions	C03
112	Write a C Program to merge two arrays	C03
113	Write a C Program to find highest frequency element in array	C03
114	Write a C Program to Store Information of a Student Using Structure	C04
115	Develop a C program that Dynamically allocates memory for storing multiple instances of the structure using pointers and malloc (or calloc)	C04
116	Write a C Program to Add Two Distances (in inch-feet system) using Structures	C04
117	Write a C program to define a union for student information containing roll number, name, and marks. Demonstrate how memory is shared in a union.	C04
118	Create a union for employee information with fields: emp_id, salary, and name. Input values for each field and print them to show how union stores only one value at a time.	C04
119	Demonstrate accessing a union variable through pointer dereferencing.	C04
120	Use a union within a structure to represent different types of bank accounts (e.g., savings and current). Input account type and show relevant fields using union.	C04
121	Write a C program to write a sentence to a text file	C05
122	Develop a C program to read and display the first line of a file	C05
123	Develop a C program to write record data to a file	C05
124	Write a C program to Read the last Line from a File	C05
125	Write a C program to copy one file into another	C05
126	Write a C program to write a structure into a file and display its content	C05
127	Write a C program to search a record in a file	C05
128	Write a program in C to read an existing file	C05
129	Write a program in C to write multiple lines to a text file	C05
130	Write a program in C to read the file and store the lines in an array	C05
131	Write a program in C to find the number of lines in a text file	C05
132	Write a program in C to find the content of a file and the number of lines in a text file	C05

133	Write a program in C to count the number of words and characters in a file	C05
134	Write a program in C to list all files and sub-directories in a directory	C05
135	Write a program in C to count number of lines in a file	C05
136	Write a program in C to merge contents of two files into a third file	C05
137	Write a program in C to count number of lines, words, characters, blank space in a file	C05
138	Write a program in C to Shutdown Computer in Linux	C05
139	Create a C program that simulates basic functionalities of an ATM system	C05
140	Develop a C program to manage the information of workers or employees in an organization using file handling	C05
141	Design a C program that helps a library in-charge efficiently manage books and customers	C05
		Total Hours: 30 hrs.

LAB Course Code: DMCA0153			LAB Course Name: Operating Systems Lab				L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)							0	0	4	2
Pre-requisite: Students are expected to be familiar with Computer Organization										
Course Objectives:										
This course gives students the ability to construct codes for OS API and the basics of OS mechanisms, and Hands-on and practical experience with the usage of the Linux OS and the basics of Shell Programming.										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Implement Linux commands to understand the concept of virtualization						K4			
CO2	Solve real-world problems using shell programming and shell scripting.						K5			
CO3	Analyze process management and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.						K5			
CO4	Implement Process Synchronization and analyze deadlock handling techniques.						K5			
CO5	Simulate the continuous and non-continuous memory allocation concepts and analyze disk scheduling algorithms.						K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	2	3	1	-	-	2		
CO2	3	2	3	3	2	-	-	3		
CO3	3	3	3	3	-	-	-	2		
CO4	3	3	3	3	-	-	1	2		
CO5	3	3	3	3	-	-	-	2		
List Of Practical's (Indicative & Not Limited To)										
S.No	Name of Experiments/ Programs							CO		
1	Study and implementation of File Manipulation Commands (cat, cp, ls, rm, mv, mkdir, rmdir, find, grep, wc, sort, more, head, tail)							CO1		
2	Study and implementation of Status Alter Commands (chgrp, chown, chmod)							CO1		
3	Study and implementation of Compile Command (cc)							CO1		
4	Study and implementation of Process Commands (ps, kill)							CO1		
5	Study and implementation of Miscellaneous Commands (echo, cal, date, whoami, expr, test)							CO1		
6	Study and implementation of Filter Commands (cut, paste, head, tr)							CO1		
7	Program to create a child process and print the process IDs of parent and child processes							CO2		
8	Shell program to check whether a given number is even or odd							CO2		
9	Shell program to find the factorial of a number							CO2		
10	Shell program to swap two integers							CO2		
11	Shell program to calculate gross salary using Basic Salary, DA and HRA							CO2		

12	Shell program to reverse the digits of a number	C02
13	Shell program to compute the sum of digits of a number	C02
14	Shell script to convert contents of files to uppercase using command line arguments	C02
15	Shell script to print time, day of month and day of week as desired by user	C02
16	Shell script to print a word n times using command line arguments	C02
17	Shell script to calculate area and perimeter of a rectangle and area and circumference of a circle	C02
18	Shell script to delete all lines containing the word "unix" from files provided as command line arguments	C02
19	Shell script to search a number in a given list of numbers	C02
20	Shell script to sort numbers in descending order using command line arguments	C02
21	Shell script to count positive and negative numbers provided as command line arguments	C02
22	Shell script to concatenate two strings	C02
23	Shell script to print Fibonacci series	C02
24	Shell script to determine whether a year is a leap year or not	C02
25	Shell script to determine whether a number is prime or not	C02
26	Program to implement First Come First Served (FCFS) CPU Scheduling Algorithm and calculate average waiting and turnaround time	C03
27	Program to implement Shortest Job First (SJF) CPU Scheduling Algorithm and calculate average waiting and turnaround time	C03
28	Program to implement Priority CPU Scheduling Algorithm and calculate average waiting and turnaround time	C03
29	Program to implement Round Robin Scheduling Algorithm and calculate average waiting and turnaround time	C03
30	Program to demonstrate Race Condition in Process Synchronization	C04
31	Program to implement Producer-Consumer Problem	C04
32	Program to implement Dining Philosophers Problem	C04
33	Program to implement Banker's Algorithm	C04
34	Program to implement First Fit, Best Fit and Worst Fit Memory Allocation Techniques	C05
35	Program to implement FIFO, LRU and Optimal Page Replacement Algorithms	C05
36	Program to implement FCFS and SSTF Disk Scheduling Algorithms	C05
37	Program to implement SCAN and CSCAN Disk Scheduling Algorithms	C05
38	Program to implement LOOK and CLOOK Disk Scheduling Algorithms	C05
		Total Hours: 30 hrs.

LAB Course Code: DMCA0155			LAB Course Name: Workplace Communication Competence 1- Lab				L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)							0	0	4	2
Pre-requisite: Comprehension of the basic English language										
Course Objectives:										
This course aims to enhance students' English language proficiency to the lower intermediate CEFR level and develop effective business communication skills. It encourages self-improvement and personal growth through self-awareness. The course also introduces essential concepts of ethics, etiquette, and life skills required for academic, professional, and personal success.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Identify key concepts of life skills							K3		
CO2	Develop effective listening skills							K3		
CO3	Compose clear and concise statements on a variety of subjects							K6		
CO4	Understand and analyze simple written texts							K4		
CO5	Demonstrate clarity while writing							K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	2	2	-	-	2	-	2	3		
CO2	2	2	-	-	3	-	-	3		
CO3	3	2	2	2	3	-	-	2		
CO4	2	3	-	2	2	-	-	2		
CO5	3	2	-	2	3	-	-	2		
List of Practical's (Indicative & Not Limited To)										
S.No	Name of Experiments/ Programs								CO	
1	The students will be familiarized with the examination pattern. Getting rid of stage fright and developing a sense of freedom and creativity								CO1	
2	The students will be able to understand the meaning of messages conveyed using body language (through videos & games like Dumb Charades).								CO1	
3	The students will practice greeting the peers and building rapport with the people around.								CO1	
4	Developing active listening and accurate communication skills. Students will practice conveying information accurately and understand the importance of clear communication (through activities like Chinese whisper).								CO1	
5	Students will enhance their reading comprehension abilities, improve vocabulary and language skills, and develop strategies for efficient and effective reading.								CO2	
6	The students will practice and learn outcome-based writing								CO3	
7	The students will practice professional introductions.								CO4	
8	The students will learn to comprehend verbal instructions, pay attention to detail, and develop the ability to follow multi-step directions accurately.								CO3	
9	The students will practice retention of the information given verbally and re-produce it through speaking.								CO4	
10	Develop critical thinking skills, analyze the effectiveness of communication practices, and gain insights into real- world communication challenges and their solutions								CO2	



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



11	Participants will be exposed to General Service List (GSL) by West and Academic Word List (AWL); the students will be asked to keep a journal of new words learnt every day.	CO2
12	The students will practice basic writing skills through sentence construction by understanding the requisites of a good sentence.	CO5
13	The students will practice listening to statements and writing exactly what they hear.	CO5
14	The students will practice responding effectively to queries/questions related to general everyday subjects (customer care, delivery agents, outlets etc.)	CO4
15	The students will be able to remove verbosity from their language. Students will participate in activities based on sample sentences and paragraphs.	CO4
16	Participants will listen to their peers reading aloud and write down the gist; and will repeat verbatim what is read.	CO5
17	Students will listen to the motivational speech by Dr A. P. J. Abdul Kalam and reflect on it.	CO2
18	Students will pair up and have short conversations with each other extracting specific information.	CO4
19	Students will learn to give directions, develop spatial awareness, and improve their navigational skills.	CO4
20	Students will learn to speak with confidence in public, using various verbal and non-verbal aspects of speech. Students will gain awareness of speaking in a professional environment and enhance their overall communication in English	CO3
21	To foster critical thinking, encourage creativity and expression, promote media literacy, and create an enjoyable learning experience by writing reviews.	CO4
22	Engaging in realistic scenarios, students will develop their communication abilities, cultural awareness, confidence, and proficiency in the target language.	CO2
23	Students will develop the ability to express their opinions, actively listen to others, and engage in constructive group discussions to develop well-rounded perspectives.	CO3
24	The students will share their key learnings from the course.	CO1
		Total Hours: 30 hrs.

Course Code: DMCA0159		Course Name: AI and Prompt Engineering Lab		L	T	P	C
Course Offered in: MCA 1 st Year (1 st Semester)				0	0	4	2
Pre-requisite: Basic knowledge of computers, programming concepts and mathematics fundamentals.							
Course Objectives:							
This course introduces fundamental AI concepts, search techniques, and AI algorithms using Python. It develops data analysis, visualization, and problem-solving skills through libraries such as NumPy, Pandas, and Matplotlib, while also covering prompt engineering for AI applications.							
Course Outcome: After completion of the course, the student will be able to				Bloom’s Knowledge Level (KL)			
CO1	Understand the fundamentals of Python Programming language			K1			
CO2	Perform list and dictionary operations, handle files, and implement object-oriented programming concepts			K3			
CO3	Apply AI search and game-playing algorithms using Python programming			K3			
CO4	Analyze and visualize data using NumPy, Pandas, and Matplotlib libraries			K4			
CO5	Design effective prompts for AI applications using prompt engineering techniques			K5			

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	-	1	-	-	-	2
CO2	3	3	2	2	1	-	-	2
CO3	3	3	2	3	1	-	-	2
CO4	2	3	2	3	1	-	-	2
CO5	2	3	3	2	2	-	1	3

List Of Practical's (Indicative & Not Limited To)

S.No	Name of Experiments/ Programs	CO
1	Installation of Python Environment and Required Libraries.	CO1
2	Program to Perform Basic Arithmetic Operations.	CO1
3	Program to Find Even or Odd Number.	CO1
4	Program to Find the Largest of Three Numbers.	CO1
5	Program to Calculate Factorial Using Function	CO1
6	Program to Demonstrate List Operations	CO2
7	Program to Demonstrate Dictionary Operations	CO2
8	Program for File Handling	CO2
9	Program to Demonstrate Classes and Objects	CO2
10	Program to Implement Breadth First Search (BFS).	CO3
11	Program to Implement Depth First Search (DFS).	CO3
12	Program to Implement Hill Climbing Algorithm.	CO3
13	Program to Implement Best First Search Algorithm.	CO3
14	Program to Implement Minimax Algorithm for Game Search.	CO3
15	Program to Implement Alpha-Beta Pruning Technique.	CO3

16	. Program to Implement A* Search Algorithm.	CO3
17	Program to Implement Iterative Deepening Search (IDS).	CO3
18	Program to Implement Means–Ends Analysis.	CO3
19	Program to Create and Print NumPy Arrays.	CO4
20	Program to Perform Arithmetic Operations using NumPy.	CO4
21	Program to Create a Data Frame using a Dictionary in Pandas.	CO4
22	Program to Create a Data Frame from NumPy Array.	CO4
23	Program to Analyze Student Performance Dataset using Pandas.	CO4
24	Program to Create Student Attendance Report using Pandas.	CO4
25	Program to Plot Monthly Temperature Data using Matplotlib.	CO4
26	Program to Compare Two Datasets using Graphs.	CO4
27	Program to Create Different Types of Graphs using Matplotlib.	CO4
28	Case Study: Integrated Data Analysis using NumPy, Pandas, and Matplotlib.	CO4
29	Write a prompt to explain Artificial Intelligence to a school student.	CO5
30	Create a prompt to summarize a paragraph in 50 words.	CO5
31	Write a prompt to generate five interview questions on Machine Learning.	CO5
32	Design a prompt to translate English text into Hindi.	CO5
33	Write a prompt to generate a professional email for a leave application.	CO5
34	Create a zero-shot prompt to classify movie reviews as positive or negative.	CO5
35	Write a zero-shot prompt to generate definitions of AI-related terms.	CO5
36	. Create a one-shot prompt for grammar correction with one example.	CO5
37	Write a one-shot prompt for converting active voice into passive voice	CO5
38	Design a one-shot prompt for sentiment analysis with one sample input-output pair.	CO5
39	Create a one-shot prompt to generate SQL queries.	CO5
40	Write a one-shot prompt for text summarization	CO5
41	Create a few-shot prompt for spam email detection.	CO5
42	Write a few-shot prompt for chatbot conversation generation.	CO5
43	Design a few-shot prompt to identify programming languages from code snippets.	CO5
44	Create a few-shot prompt for product review classification.	CO5
45	Write a few-shot prompt to generate captions for social media posts.	CO5
46	Write a prompt where AI acts as a teacher explaining Python basics.	CO5
47	Create a prompt where AI acts as a career counselor, suggesting IT career paths.	CO5
48	Design a role-based prompt where the AI acts as a doctor, giving health precautions.	CO5
49	Write a prompt where the AI acts as an interviewer for software engineering jobs.	CO5
50	Create a role-based prompt where the AI acts as a travel guide.	CO5
51	Improve the following vague prompt: “Tell me about AI.”	CO5
52	Rewrite a prompt by adding clear instructions and constraints.	CO5

53	Design a prompt with specific output formatting requirements.	CO5
54	Write a prompt that requests step-by-step problem solving.	CO5
55	Create a prompt that generates answers in bullet-point format only.	CO5
56	Design prompts to compare two programming languages.	CO5
57	Create a prompt to generate quiz questions automatically.	CO5
58	Write a prompt for generating lesson plans for teachers.	CO5
59	Create a prompt to generate Python programs for searching algorithms.	CO5
60	Design a prompt for creating a chatbot response system.	CO5
61	Write a prompt to generate business ideas for startups.	CO5
62	Create a prompt for generating resume content automatically.	CO5
63	Design a prompt for analyzing student performance data.	CO5
64	Write a prompt to generate a marketing slogan for a product.	CO5

Total Hours: 30 hrs.

Textbook:

	Authors Name
1. Automate the Boring Stuff with Python: Practical Programming for Total Beginners, No Starch Press, 2019.	Al Sweigart,
2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter, O'Reilly Media, 2022.	Wes McKinney
3. Artificial Intelligence: A Modern Approach, Pearson Education, 2021.	Stuart Russell and Peter Norvig

Reference Books:

	Authors Name
1. Introduction to Artificial Intelligence, Pearson Education, 2021.	Ethem Alpaydin
2. Artificial Intelligence for Dummies, Wiley India Pvt. Ltd., 2020.	John Paul Mueller and Luca Massaron

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	14 Hrs. 3 Hrs 36 Min
Video Lectures	1 Hrs 1 Hrs 1 Hrs 06 Min 37 Min 43 Sec 31 Min 19 Sec
Web References	

<https://www.coursera.org/learn/introduction-to-ai>
https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013719953643773952304_shared/overview

<https://www.youtube.com/watch?v=VGFpV3Qj4as>
<https://www.youtube.com/watch?v=VGFpV3Qj4as>
<http://youtube.com/watch?v=D1eL1EnXXXQ>
<https://www.youtube.com/watch?v=2BpCk4d2Cc0>
<https://www.youtube.com/watch?v=ZPPb7AoY2Lk>

<https://docs.python.org/3/>
<https://numpy.org/doc/>
<https://matplotlib.org/stable/users/index.html>
<https://www.geeksforgeeks.org/artificial-intelligence/artificial-intelligence/>
<https://openai.com/academy/prompting/>

Course Code: DMCA0201			Course Name: Cognitive Ability					L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)								2	1	0	3
Pre-requisite: Basic understanding of elementary mathematics											
Course Objectives: The objective of this course is to develop students' quantitative aptitude and logical reasoning skills through number theory, analytical puzzles, and business mathematics, enabling them to solve real-world and competitive exam problems with speed, accuracy, and logical thinking.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Apply fundamental number theory concepts such as divisibility, HCF & LCM, remainder theorem, and cyclicity to solve quantitative problems efficiently.							K2, K3			
CO2	Solve problems involving logical reasoning and analytical thinking, including direction sense, blood relations, series patterns, and time-based puzzles like clocks and calendars.							K3			
CO3	Solve the problems involving Percentage, Ratio, Proportion, Partnership, Problem of ages and coding decoding							K2, K3			
CO4	Solve real-life business math problems involving percentages, profit and loss, discounts, interest calculations, averages, mixtures, and ratios using appropriate mathematical methods							K2, K3			
CO5	Solve quantitative aptitude problems involving time and work, wages, pipes and cisterns, speed-distance-time, and race-related scenarios, using mathematical formulas and real-world applications.							K2, K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	3	2	-	-	-	-	1		
CO2		3	3	2	-	-	-	-	1		
CO3		3	3	2	-	-	-	-	1		
CO4		3	3	3	-	-	-	-	2		
CO5		3	3	3	2	-	-	-	2		
Course Contents / Syllabus											
Unit 1			Quantitative Ability (Basic Mathematics)							6 hours	
Number Systems, LCM and HCF, Decimal Fractions, Simplification, Square Roots and Cube Roots, Average Problems on Ages, Surds & Indices, Percentages, Problems on Numbers											
Unit 2			Quantitative Ability (Applied and Engineering Mathematics)							6 hours	
Logarithm, Permutation and Combinations, Probability, Profit and Loss, Simple and Compound Interest, Time, Speed and Distance, Time & Work, Ratio and Proportion, Area, Mixtures and Allegation											
Unit 3			Quantitative Aptitude							6 hours	
Work & Wages, Pipes & Cistern, Time & Distance, Percentage, Trigonometry, Height and Distance, Algebra, Age, Simple Interest and Compound Interest, Geometry.											
Unit4			Logical Reasoning (Deductive Reasoning)							6 hours	
Analogy, Blood Relation, Directional Sense, Number and Letter Series, Coding – Decoding, Calendars, Clocks, Venn Diagrams, Seating Arrangement, Syllogism, Mathematical Operations											
Unit 5			Data Interpretation							6 hours	
Data Interpretation, Tables, Columns, Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams											
Total Lecture Hours										30 hours	

Reference Books:

S. No	Book Title	Author
1	Quicker math	M. Tyra (BSC Publication Co. Pvt. Ltd)
2	Quantitative Aptitude	RS Aggarwal
3	Verbal & Non-Verbal Reasoning	RS Aggarwal
4	Quantitative Aptitude - Quantum CAT	Sarvesh K Verma
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013823999423_57811246/overview	1Hrs 1Min
Video Lectures	https://onlinecourses.nptel.ac.in/noc25_hs178/preview https://freevideolectures.com/course/2600/introduction-to-cognitive-psychology https://alison.com/course/cognitive-processing-reasoning-decisions-and-problem-solving https://www.futurelearn.com/courses/introduction-to-cognitive-psychology https://www.youtube.com/channel/UCNFzbRdAaWFFtc2s1YG2Vtw	20Hrs 15Hrs 3Hrs 12Hrs 1Min 6Sec
Web References	https://www.coursera.org/ https://www.indiabix.com https://www.careerride.com/ https://www.geeksforgeeks.org/aptitude-gq/ https://www.khanacademy.org	

Course Code: DMCA0202			Course Name: Database System				L	T	P	C
Course Offered in: MCA 1st Year (2nd Semester)							3	0	0	3
Pre-requisite: Students are expected to be familiar with basic computer knowledge, as well as the fundamentals of mathematics and logical reasoning.										
Course Objectives:										
To introduce DBMS concepts emphasizing efficient organization, maintenance, and retrieval of information in relational and non-relational databases.										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Understand the basic concepts of DBMS, data models, ER/EER models, and relational algebra/calculus.						K2			
CO2	Apply SQL queries to perform data manipulation, constraints, aggregate functions, and normalization techniques.						K3			
CO3	Analyze and construct complex SQL queries, including nested queries, joins, and set operators, and implement database connectivity.						K4			
CO4	Develop PL/SQL programs and manage transactions with concurrency control mechanisms.						K3			
CO5	Implement and manage NoSQL databases using MongoDB and understand cloud database concepts.						K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	2	2	-	-	-	2		
CO2	3	3	3	3	-	-	-	2		
CO3	3	3	3	3	-	-	-	2		
CO4	3	3	3	3	-	-	1	2		
CO5	3	3	3	3	-	-	-	3		
Course Contents / Syllabus										
Unit 1		INTRODUCTION OF DATABASE & CONCEPTUAL DESIGNING							9 hours	
Introduction about the DBMS: Basic Concept: - Introduction of Data, Information, Database, DBMS, database system, structured, semi-structured and unstructured data. Database system Vs File system. Data models & Types of Data Models: Relational Database: Relation, Tuple, Attribute and Domain, Codd Rules, Design & Implement the ER Diagram Data Modelling using the Entity Relationship Model: ER model concepts, Degree of relationship, Notations for ER diagram, mapping constraints, reduction of ER diagrams to tables. Extended Entity Relationship Diagram & reduction of EER diagram to tables. Introduction on SQL: Implements the DDL, DML, DCL & TCL: Introduction on SQL & Types of SQL commands: - DDL, DML, DCL, TCL. Introduction on Relational Algebra& relational Calculus: Basics of Relational Algebra and Relational calculus										
Unit 2		BASIC OF SQL & NORMALIZATION							9 hours	
Implementation of the Keys: Keys & Types of Keys: - Super key, Candidate Key, Primary Key, Alternative Key, Composite Primary key, Foreign Key, unique, and Composite Unique key Implementation of Data Constraint: Data Constraint: - Null, Not Null, Default, and Check Constraint Implementation of Aggregate function & clause: Use of Aggregate Function: -Min (), Max (), Count (), AVG (), Sum (). Use of Clause: Where, Group by, Having, and Order by Understand & implement the normalization: Uses of String Functions in SQL, Uses of mathematical functions in SQL. Uses of Advanced Functions in SQL: Armstrong's axioms. Functional Dependencies, Normalization & Types of										

Normalization, 1NF, 2NF, 3NF, BCNF. Multivalued Dependency, Join Dependency. Minimal Cover of FD's, Closure of an attribute, Lossless join decomposition Different types of functions in SQL: Uses of String Functions in SQL, Uses of mathematical functions in SQL. Uses of Advanced Functions in SQL		
Unit 3	INTRODUCTION OF COMPLEX QUERIES	9 hours
Operator & Predicates: Operator & Predicates: - Like, Between, Aliases, Distinct, Limit, Implementation of logical operators: And, Or, Not. Set Theory Operator: Basic Set Operators: Selection, projection, rename, cross product, union, set difference Derived Operators: Intersection, Division, Join. Inner Join: - Natural Join, Equi Join & Non-Equi Join. Outer Join: - Left Outer Join, Right Outer Join and Full Outer Join. Nested Query: Nested Query, Sub Query or Correlated Query: -IN, NOT IN, Exists, Not Exists, All, Any Implementation the database connectivity: Database connectivity with Java or Python		
Unit 4	PL/SQL AND TRANSACTION & CONCURRENCY CONTROL	9 hours
Implementation Index and Views: Managing Indexes, Synonyms and Sequences, Managing Views, Managing Data in Different Time Zones Implementation of PL/SQL: Introduction of PL/SQL, Implementation of PL/SQL Function, Procedure, Trigger, Cursor Implementation of Transaction management & concurrency control: Transaction system: - Life cycle of transaction, ACID Properties. Serial, non-serial schedule. Conflict Serializability. View Serializability. Recoverable Schedule, Cascade less schedule. Cascading rollback. Control Concurrency Techniques: Concurrency Control, Locking Techniques for concurrency control, 2-phase Locking protocol, strict 2 -phase locking protocol, rigorous 2-phase locking protocol Transaction & Data Control: Grant, Revoke, Commit & Rollback		
Unit 5	INTRODUCTION OF NoSQL WITH MongoDB	9 hours
Understand NoSQL Concept and implement the CRUD operations: Introduction of NoSQL Data Models: Document, Key Value, Column family, Graph. Overview of NoSQL Databases with their Types, Uses & Features of NoSQL Document Databases. CAP theorem, BASE vs ACID. Introduction and Features of MongoDB: Sharding, Load Balancing, Indexing, Replication. MongoDB Shell & their commands: Mongosh, MongoDB, MongoDB Compass. MongoDB Collection, Document, Field & Value. MongoDB Operators, CRUD operations, and Implement the MongoDB Cursor Relation and Aggregation in MongoDB: MongoDB Cursor & Methods, Relations in MongoDB, Aggregation in MongoDB Understand the concept of cloud database: Introduction of Cloud Database. MongoDB Cloud: Atlas, Cloud Manager.		
Total Lecture Hours		45 hours
Textbook:		
		Authors
1. Database System Concepts, Seventh Edition, McGraw - Hill. (2019)		Korth, Silbertz, Sudarshan,
2. Fundamentals of Database Systems, Seventh Edition Addison Wesley. (2017)		Elmasri, Navathe ,
3. SQL, PL/SQL: The programming language of Oracle, , Fourth Edition, BPB Publication. (2010)		Ivan Bayross
4. NoSQL with MongoDB in 24 Hours, , Sams Publishing; 1st edition (2014)		Brad Dayley
Reference Books		
		Authors
1. Database Systems: A Practical Approach to Design, Implementation and Management, Third Edition, Pearson Education, (2007)		Thomas Cannolly and Carolyn Begg,
2. Database Management Systems, Third Edition, McGraw-Hill (2002)		Raghu Ramakrishnan and Johannes Gehrke
3. An Introduction to Database Systems, Eighth Edition, Pearson. (2004)		C J Date
Self-Study Content Links:		Duration (in Hrs)



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014157694752448512174/overview https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384326459684454434457_shared/overview	16 Hrs 26 Min 1 Hrs 2 Min
Video Lectures	https://archive.nptel.ac.in/courses/106/106/106106220/ https://onlinecourses.nptel.ac.in/noc21_cs04/preview https://www.youtube.com/watch?v=FNyDBLwZ6cE https://www.youtube.com/watch?v=CbG8WHmAv1M https://www.udemy.com/course/sql-to-nosql-database-handson-with-mongodb/	5 Min 16 Sec 5 Min 16 Sec 49 Min 55 Sec 1 Hrs 16 Min 22 Min 43 Sec
Web References	https://docs.oracle.com/en/database/oracle/oracle-database/26/sqlrf/Introduction-to-Oracle-SQL.html https://docs.oracle.com/en/database/oracle/oracle-database/26/sqlrf/SQL-Functions.html https://docs.oracle.com/en/database/oracle/oracle-database/26/sqlrf/Conditions.html https://docs.oracle.com/en/database/oracle/oracle-database/26/cncpt/transactions.html https://www.mongodb.com/docs/manual/	

Course Code: DMCA0203			Course Name: Data Structures					L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)								3	0	0	3
Pre-requisite: Students are expected to have knowledge of programming languages, along with a foundation in mathematics and Problem-solving ability.											
Course Objectives:											
This course introduces fundamental data structures, algorithm analysis, and efficient problem-solving techniques. It develops skills in Implementing linear and non-linear data structures, analyzing performance, and designing optimized software solutions for real-world applications.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Describe the need for data structures and algorithms in problem solving, and Analyze Time space trade-off. Analyze and								K4		
CO2	Describe the real-world applications using a stack and a queue								K2		
CO3	Discuss different Linked list operations								K3		
CO4	Evaluate the real-world applications using non-linear data structures								K5		
CO5	Identify and analyze the computational efficiencies of searching and sorting algorithms in real world problems								K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	2	2	-	-	-	2			
CO2	3	2	2	2	-	-	-	1			
CO3	3	2	2	2	-	-	-	1			
CO4	3	3	3	3	-	-	-	2			
CO5	3	3	3	3	-	-	-	3			
Course Contents / Syllabus											
Unit 1		INTRODUCTION TO DATA STRUCTURES								09 hours	
Data Types: Types of Data Structures- Linear & Non-Linear Data Structures, Arrays: Derivation of Index Formulae for 1-D,2-D, 3-D, and n-D Array											
Analysis of algorithms: Time and Space Complexity of an algorithm, Asymptotic notations (Big Oh, Big Theta and Big Omega).											
Unit 2		STACK & QUEUES								09 hours	
Stacks: Primitive Stack operations: Push & Pop, mutual conversion of Infix, Prefix, Postfix, and Evaluation of postfix expression.											
Recursion: Principles of recursion, Types of Recursions, Problem solving using iteration, Tower of Hanoi, Trade-offs between iteration and recursion.											
Queues: Operations on Queue: Create, Insert, Delete, Full and Empty, Circular queues, Dequeue, and Priority Queue.											
Unit 3		LINKED LISTS								09 hours	
Linked lists: Linked lists: Comparison of Array, List, and Linked list Types of linked list: Singly Linked List, Doubly Linked List, Circular Linked List, Polynomial Representation, and Addition of Polynomials.											
Unit 4		TREES								09 hours	
Trees: Basic terminology, Binary Trees, Binary Tree Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, Extended Binary Tree, Tree Traversal algorithms: In-order, Pre-order, and Post-order. Constructing a Binary Tree from given Tree											
Traversal, Binary Heaps, Heap Operations, and Threaded Binary trees, Traversing Threaded Binary trees, AVL Tree, B-Tree.											
Unit 5		GRAPHS								09 hours	
Graphs: Terminology used with Graph, Graph Sorting Techniques: Representations: Adjacency matrices, Adjacency List. Connected Component, Spanning Trees, Prim's and Kruskal's algorithm, Shortest Path algorithms: Dijkstra Algorithm, Floyd Warshall's Algorithm											
Hashing: Sorting Algorithms. Hashing: Hash Functions, Collision- Resolution Techniques.											
Total Lecture Hours										45 hours	

Textbook:		
		Authors Name
1. Data Structures and Algorithms in Python (An Indian Adaptation), Wiley Publication		Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser
2. DATA STRUCTURES USING PYTHON, Oxford Higher Education, First Edition		Dr Shriram K. Vasudevan (Author), <u>Mr Abhishek S. Nagarajan</u> (Author), Prof Karthick Nanmaran (Author)
3. Problem Solving in Data Structures & Algorithms Using Python, 1 January 2022, Third Edition		Hemant Jain
Reference Books:		
		Authors Name
1. Data Structure (Mumbai University), Himalaya Publishing House		Kiran Gurbani, Krupa Kamdar.
2. Data Structures with Python: Get Familiar with the Common Data Structures and Algorithms in Python, BPB Publications, 1 May 2023.		Harsh Bhasin
3. Data Structures and Algorithms Using Python, Notion Press, 13 April 2023.		Sharma
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384203240484864010470_shared/overview	18 Hrs 05 Min
	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384203356028108810795_shared/overview	3 Hrs 28 Min
Video Lectures	https://www.youtube.com/watch?v=RBSGKIAvoiM	8 Hrs 5 Min
	https://www.youtube.com/watch?v=rHQI4mrJ3cg	1 Hrs 30 Min
	https://www.youtube.com/watch?v=6wXZ_m3SbEs	29 Min
	https://www.youtube.com/watch?v=4s1Tcvm00pA	2 Hrs 52 Min
	https://www.youtube.com/watch?v=FsfRsGFHuv4	13 Min
Web References	https://www.programiz.com/dsa	
	https://www.tutorialspoint.com/data_structures_algorithms/dsa_queue.htm	
	https://www.geeksforgeeks.org/dsa/doubly-linked-list/	
	https://www.tutorialspoint.com/data_structures_algorithms/b_trees.htm	
	https://www.geeksforgeeks.org/dsa/dijkstras-shortest-path-algorithm-greedy-algo-7/	

Course Code: DMCA0204		Course Name: Design Thinking – I		L	T	P	C
Course Offered in: MCA 1st Year (2nd Semester)				3	0	0	3
Pre-requisite: Basic communication, analytical thinking, and an interest in creativity, problem-solving, and teamwork.							
Course Objectives:							
The objective of this course is to familiarize students with the design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite their minds to create innovative ideas as develop solutions for real-time problems.							
Course Outcome: After completion of the course, the student will be able to				Bloom's Knowledge Level (KL)			
CO1	Develop a strong understanding of the design process and apply it in a variety of business settings			K1			
CO2	Analyze self, culture, and teamwork to work in a multidisciplinary environment and exhibit empathetic behavior			K3			
CO3	Formulate specific problem statements of real-time issues and generate innovative ideas using design tools			K4			
CO4	Apply critical thinking skills to arrive at the root cause from a set of likely causes			K4			
CO5	Demonstrate an enhanced ability to apply design thinking skills for the evaluation of claims and arguments			K4			

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	3	2	3	2	2	2	1	2
C02	1	2	2	1	3	1	2	3
C03	2	3	3	2	2	1	1	2
C04	2	3	2	2	1	1	1	2
C05	2	3	3	2	1	1	1	3

Course Contents / Syllabus

Unit 1	INTRODUCTION	9 hours
An overview of future skills, introduction to design thinking, traditional problem solving versus design thinking, history of design thinking, wicked problems. Innovation and creativity, the role of innovation and creativity in organizations, creativity in teams and their environments, design mindset. Introduction to elements and principles of design, 13 Musical Notes for Design Mindset, Examples of Great Design, Design Approaches across the world. Case Studies: Mumbai Dabbawallas, Gillette, Singapore, Bengaluru, Bahubali, Google, Embrace Incubator Activity: Observation, Wicked Problem		
	ETHICAL VALUES AND EMPATHY	9 hours
Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, and the gap between desires and actualization. Understanding culture in family, society, institution, startup, and the socialization process. Ethical behavior effects on self, society, understanding core values and feelings, negative sentiments and how to overcome them, definite human conduct universal human goal, developing human consciousness in values, policy, and character. Understanding stakeholders, techniques to empathize with, identify key user problems. Empathy tools: interviews, empathy maps emotional mapping, immersion and observations, Emotional Intelligence, customer journey maps, classifying insights after Observations Classifying Stakeholders. Case Studies: Pure-it, Royal Enfield, BigBasket, Airbnb. Activity: Moccasin Walk, Persona, Empathy map, Journey Map		

Unit 3	PROBLEM STATEMENT AND IDEATION	9 hours
Defining the problem statement, creating personas, Point of View (POV) statements. Research identifying drivers, information gathering target groups, samples, and feedbacks. Idea Generation basic design directions, Themes of Thinking, inspirations and references brainstorming, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, analyze – four W's, 5 why's, "How Might We", Defining the problem using Ice-Cream Sticks, Metaphor & Random Association Technique, Mind-Map, ideation activity games - six thinking hats, million-dollar idea, introduction to visual collaboration and brainstorming tools - Mural, JamBoard. Case Studies: The Good Kitchen, Flipkart, Uber, Redbus, Big Bazaar Activity: 5 Why, HMW, Brainstorming, Six Thinking Hats, 30 Circles, paper prototype		
Unit 4	CRITICAL THINKING	9 hours
Fundamental concepts of critical thinking, the difference between critical and ordinary thinking, characteristics of critical thinkers, critical thinking skills- linking ideas, structuring arguments, recognizing incongruences, five pillars of critical thinking, argumentation versus rhetoric, cognitive bias, tribalism, and politics. Case study on applying critical thinking to different scenarios. Case Studies: Byju's, Maggi noodles, Tata Nano Activity: debate, role play		
Unit 5	LOGIC AND ARGUMENTATION	9 hours
The argument, claim, and statement, identifying premises and conclusion, truth and logic conditions, valid/invalid arguments, strong/weak arguments, deductive argument, argument diagrams, logical reasoning, scientific reasoning, logical fallacies, propositional logic, probability, and judgment, obstacles to critical thinking. Group activity/role plays on evaluating arguments. Case Studies: Aadhaar Card, Demonetization, Odd-Even Policy, Jio Activity: Logical Fallacy Detective, Fact-Checking Challenge		
Total Lecture Hours		45 hours
Textbook:		
	Authors	
1. Science & Art of Design Thinking, UnMukt, 2020, Polaris	Arun Jain	
2. Solving Problems with Design Thinking – Ten Stories of What Works, 2013, Columbia Business School Publishing	Jeanne Liedta, Andrew King and Kevin Benett	
3. A Foundation Course in Human Values and Professional Ethics Bagaria 2009 First Edition, RR Gaur, R Sangal, G P Bagaria 2009, Excel Books: New Delhi		
Reference Books:		
	Authors	
1. Design Methods: A Structured Approach for Driving Innovation in Your Organization 2013, John Wiley and Sons Inc, New Jersey	Vijay Kumar	
2. Design thinking for strategic innovation: What they can't teach you at business or design school (2013) John Wiley & Sons.	Mootee, I.	
3. Basics Design 08: Design Thinking, 2010, AVA Publishing SA	Gavin Ambrose and Paul Harris	
4. Design of Business: Why Design Thinking is the Next Competitive Advantage 2009, Harvard Business Press, Boston, MA	Roger L. Martin	
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0127858770650972161567_shared/overview	3 Hrs 31 Min
	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014157679910699008136/overview	2 Hrs 21 Min
Video Lectures	https://www.youtube.com/watch?v=p5m7CoHC4r4	1 Hrs 10 Min
	https://www.youtube.com/watch?v=ZBGmcvPmRhY	1 Hrs 56 Min
	https://www.youtube.com/watch?v=95YvWYatFcc	13 Min 22 Sec
	https://www.youtube.com/watch?v=EC2IYEWJ4Lc	9 Min 11 Sec
	https://www.youtube.com/watch?v=v9k7kA01eZs	1 Hrs 9 Min



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



Web References	https://designthinking.ideo.com https://greatergood.berkeley.edu/topic/emotional_intelligence https://www.mindtools.com/aajlpple/six-thinking-hats? https://www.skillsyouneed.com/learn/critical-thinking.html https://www.criticalthinking.org/pages/our-conception-of-critical-thinking/411?	
----------------	---	--

Course Code: DMCA0211			Course Name: CRM Administration					L	T	P	C	
Course Offered in: MCA 1 st Year (2 nd Semester)								3	0	0	3	
Pre-requisite: Basic Knowledge of Computer Science												
Course Objectives:												
Understand the concepts of Salesforce App. Understand the concepts of Lightning Experience. Familiarize with concepts administration. Learn Admin Essentials in Lightning Experience												
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)			
CO1	Describe the workings of Trailhead.								K2			
CO2	Describe the importance of Salesforce and its features.								K2			
CO3	Implement the validations in Data modelling.								K3			
CO4	Describe the importance of user management.								K2			
CO5	Identify and implement Security concepts in Industry.								K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8				
CO1	2	1	-	2	-	-	-	2				
CO2	3	2	1	2	-	-	-	2				
CO3	3	3	3	3	-	-	1	2				
CO4	2	2	1	2	1	-	2	2				
CO5	3	3	2	3	-	-	3	3				
Course Contents / Syllabus												
Unit 1		Introduction							9 hours			
Salesforce Platform Basics, User Management, Data Modelling, Data Management, Identity Basics, Data Security, Lightning Experience Customization, Lightning APP Builder, Salesforce Mobile App Customization, User Engagement, Formulas and Validation, Data Security, Picklist Administration.												
Unit 2		Lightning & Salesforce App Experience Customization							9 hours			
Formula and Validation, Accounts and Contacts for Lightning Experience, Lead and Opportunity for Lightning Experience, Product Quotes and Contracts, Campaign Basic												
Unit 3		Salesforce Administration							9 hours			
Service Cloud for Lightning Experience, Salesforce mobile app customization, App Exchange basic Duplicate Management Lightning Experience for Salesforce Classic Users, Chatter Administration for Lightning Experience, Reports and Dashboards for Lightning experience, Lightning experience customization, Lightning experience rollout, Salesforce flow, Lightning experience report dashboard Specialist												
Unit 4		Lightning Experience							9 hours			
Prepare Your Salesforce Org for Users, Customize an Org to Support a New Business Unit, Protect Your Data in Salesforce, Customize a Sales Path for Your Team, customize a Salesforce Object, Import and Export with Data Management Tools												
Unit5		Learn Admin Essentials in Lightning Experience							9 hours			
Learn about the custom object and custom field in Salesforce Lightning, uses of Custom Object and Custom field in Lightning, Workflow in Lightning, Update Record Field using Workflow, Send Email alert using Workflow, Data Loader in Salesforce Lightning.												
									Total Lecture Hours			45 hours
Textbook:												
S. No	Book Title			Author								
1.	Digital Marketing for Dummies			Ryan Deiss, Russ Henneberry, John Wiley & Sons, 2020								
2.	Youtility			Jay Baer, Portfolio, 2013								
3.	Epic Content Marketing			Joe Pulizzi, McGraw-Hill Education, 2013								
Reference Books:												
S. No	Book Title			Author								
1	Customer Relationship Management			S. Shajahan, Himalaya Publishing House, 2012								



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



2	Customer Relationship Management	Alok Kumar Rai, Oxford University Press, 2015
3	Customer Relationship Management	Jagdish N. Sheth & Others, McGraw-Hill, 2002
4	CRM: A Strategic Approach	Kumar V., Excel Books, 2014
5	Customer Relationship Management	Peeru Mohamed & Sagadevan, PHI Learning, 2016
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01350159223215718412587/overview	1Hrs 15Min
	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384351202229452840551_shared/overview	1Hrs 2Min
Video Lectures	https://www.youtube.com/watch?v=SHbpMG9ARX0&list=PLNfnAKZ4ZsaqN1TYJtELohOWWqgxdrSim	17Min 12Sec
	https://www.youtube.com/watch?v=ARViyVnWZYk&list=PLNfnAKZ4ZsaqN1TYJtELohOWWqgxdrSim&index=4	10Min 47Sec
	https://www.youtube.com/watch?v=PmJ5vaCBc_g	6Min 8Sec
	https://www.youtube.com/watch?v=fIAMkMQwp4&list=PLEiEAq2VkUUK0x8URvIzHZ3_JYTdHxTAd	3Hrs 33Min 35Sec
	https://www.youtube.com/watch?v=qzmgEMsme24	14Min 34Sec
Web References	https://trailhead.salesforce.com https://www.coursera.org/learn/packt-salesforce-crm-administration-handbook https://www.udemy.com/course/microsoft-dynamics-crm-administration https://www.geeksforgeeks.org/software-engineering/customer-relationship-management-crm/ https://www.zoho.com/crm/resources/	

Course Code: DMCA0212			Course Name: Fundamentals of Digital Marketing and Analytics				L	T	P	C
Course Offered in: MCA 1st Year (2nd Semester)							3	0	0	3
Pre-requisite: Students should be able to think creatively.										
Course Objectives:										
The course aims to equip learners with foundational skills in digital marketing and analytics, covering strategies, tools, metrics, and analytics techniques essential for effective digital marketing campaign planning, execution, and optimization.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Develop proficiency in interpreting marketing strategies in the digital age and provide fundamental knowledge for working in an online team.							K2		
CO2	Discuss various concepts of data analytics pipeline.							K2		
CO3	Evaluate the productivity of digital marketing channels for business success.							K3		
CO4	Prepare candidates for global exposure of digital marketing practices to make them employable in a high growth industry.							K2		
CO5	Learn basic concepts and understand association rules mining.							K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	2	2	3	1	1	2		
CO2	3	3	2	3	-	-	-	2		
CO3	2	3	3	2	-	2	-	3		
CO4	2	2	3	2	2	2	2	3		
CO5	3	3	2	3	-	-	-	2		
Course Contents / Syllabus										
Unit 1		Fundamentals of Digital marketing							9 hours	
Fundamentals of Digital Marketing: Fundamentals of Digital Marketing & Its Significance, Traditional Marketing vs Digital Marketing, Evolution of Digital Marketing, Digital Marketing Landscape, Key Drivers, Digital Consumer & Communities, Gen Y & Netizens' expectations & influence with respect to Digital Marketing.										
Unit 2		Introduction to Data Analytics							9 hours	
Introduction to Data Analytics: Sources and nature of data, classification of data (structured, semi-structured, unstructured), characteristics of data, introduction to Big Data platform, need for data analytics, evolution of analytic scalability, analytic process and tools, analysis vs reporting, modern data analytic tools, applications of data analytics.										
Data Analytics Lifecycle: Need key roles for successful analytic projects, various phases of the data analytics lifecycle, discovery, data preparation, model planning, model building, communicating results, and operationalization										
Unit 3		Prepare Data for Exploration and Stakeholder							9 hours	
Prepare Data for Exploration and Stakeholders: Data analysts, balance needs and expectations, manage stakeholder expectations, communication with your team.										
Datatypes and structures: Generate data, Collection of data, analysis for data, Bias, credibility, privacy, ethics, and access-data analysts work, data is unbiased and credible, different types of bias in data, importance of data ethics and data privacy.										
Unit 4		Organizing and protecting your data							9 hours	
Organizing and protecting Databases: Where data lives- databases, access them and extract, filter, and sort the data, metadata, and its different types and how analysts use them.										

Organizing and protecting your data: Organizing data and keeping it secure, analysts use file naming conventions.

Engaging in the data community: How to manage your online presence, benefits of networking with other data analytics professionals.

Unit 5	Introduction to Data Mining	9 hours
---------------	------------------------------------	----------------

Introduction to Data Mining: Introduction, what is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binarization, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

Total Lecture Hours	45 hours
----------------------------	-----------------

Textbook:

1. Digital Marketing. Oxford University Press Vandana, Ahuja	
2. Strategic Digital Marketing: Top Digital Experts Share the Formula for Tangible Returns on Your Marketing Investment, McGraw-Hill Education	Eric Greenberg, & Kates, Alexander
3.E-Commerce: Strategy, Technologies, and Applications, McGraw-Hill Education,	Whiteley, David
4. Data Mining: Concepts and Techniques, Micheline,3rd Edition, 2011	Morgan Kaufmann Han, Jiawei, Pei, Jian, & Kamber,

Reference Books:

	Authors
1.Basics of Data Analytics, Notion Press, 2021	Richa Mishra, Dr. Nirvikar Katiyar, & Apoorv Mishra
2.Data Analytics: Become a Master in Data Analytics, Independently, Published, 2020	Richard Dorsey
3. Introduction to Data Mining (2nd ed.) Pearson, 2018.	Tan, Pang-Ning, Steinbach, Michael, Karpatne, Anuj, & Kumar, Vipin

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384209039567257612388_shared/overview 3 Hrs 58 Min https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384352533933260840816_shared/overview 3 Hrs 55 Min
Video Lectures	https://www.youtube.com/watch?v=BCNnkdFLWgE https://www.youtube.com/watch?v=xips358IZuk https://www.youtube.com/watch?v=TuDnAD3seng https://www.youtube.com/watch?v=fg1OHw28Fzs&t=1s https://www.youtube.com/watch?v=y1CIZqOUTJ0 13 Min 58 Sec 51 Min 08 Sec 2 Hrs 21 Min 49 Min 47 Sec 17 Min 51 Sec
Web References	https://learndigital.withgoogle.com/digitalgarage/course/digital-marketing? https://www.ibm.com/think/topics https://learn.microsoft.com/en-us/training/ https://learn.microsoft.com/en-us/training/modules/explore-relational-data-offerings/ https://docs.oracle.com/en/database/oracle/machine-learning/

Course Code: DMCA0213				Course Name: Machine Learning				L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)								3	0	0	3
Pre-requisite: Basic programming knowledge in Python, fundamentals of mathematics and statistics. Basic Modeling Concepts.											
Course Objectives:											
This course introduces the fundamentals of Machine Learning, including data preprocessing, ML tools, and the complete ML workflow. It develops skills in applying supervised and unsupervised learning algorithms, evaluating model performance, and understanding advanced ML concepts, reinforcement learning, ethical considerations, and real-world applications.											
Course Outcome: After completion of the course, the student will be able to									Bloom’s Knowledge Level (KL)		
CO1	Understand ML fundamentals, workflow, preprocessing techniques and Python-based ML tools for data analysis							K2			
CO2	Apply supervised learning algorithms and evaluation techniques for regression and classification problems							K3			
CO3	Analyze unsupervised learning and feature engineering techniques for clustering, dimensionality reduction and pattern discovery							K4			
CO4	Utilize advanced Machine Learning concepts, ensemble methods and modern ML tools for solving real-world applications							K3			
CO5	Explain Reinforcement Learning concepts, ethical challenges and emerging trends in Machine Learning systems							K2			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	-	2	1	-	-	1		
CO2		3	3	2	2	1	-	-	1		
CO3		2	3	2	2	1	-	-	1		
CO4		2	2	3	3	1	1	1	2		
CO5		1	2	1	1	-	2	3	3		
Course Contents / Syllabus											
Unit 1		Introduction & Foundations								10 hours	
Introduction: Definition and importance, Applications Types: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Machine Learning Workflow: Types of Data, Data collection, Data preprocessing, Model training, Testing and deployment Tools for Machine Learning: Google Collab, Kaggle, Virtual Environment Python Foundations for ML: Python basics, NumPy, Pandas, Matplotlib, Scikit-learn, Keras Data Preprocessing Techniques: Handling missing values, Encoding categorical data, Feature scaling, Normalization Dataset Handling: Training dataset, Validation dataset, Testing dataset Model Issues: Overfitting, Underfitting, Bias and Variance basics Introduction to Evaluation: Basic evaluation concepts and performance analysis.											
Unit 2		Supervised Learning								10 hours	

Introduction: Regression and Classification concepts

Regression Algorithms: Linear Regression, Multiple Linear Regression, Regression applications

Classification Algorithms: Logistic Regression, K-Nearest Neighbors (KNN), Naïve Bayes Classifier, Decision Tree, Random Forest, Support Vector Machine (SVM)

Model Training Concepts: Training and prediction process, Hyperparameter tuning basics

Performance Evaluation Metrics: Confusion Matrix, Accuracy, Precision, Recall, F1-Score, ROC-AUC

Validation Techniques: Cross Validation basics, Model comparison techniques.

Unit 3

Unsupervised Learning

10 hours

Introduction: Clustering concepts and applications

Clustering Algorithms: K-Means Clustering, Hierarchical Clustering, DBSCAN basics

Dimensionality Reduction Techniques: Principal Component Analysis (PCA), applications

Feature Engineering: Feature selection, Feature extraction, Handling categorical data

Association Rule Mining: Apriori Algorithm basics, Market Basket Analysis concepts

Data Visualization Techniques: Scatter plot, Heatmap, Correlation analysis

Applications of Unsupervised Learning: Customer segmentation, Pattern discovery, Recommendation analysis.

Unit 4

Advanced Machine Learning Concepts and Applications

08 hours

Ensemble Learning Techniques: Bagging and Boosting concepts, Random Forest basics, AdaBoost basics

Recommendation Systems: Basic concepts and applications

Introduction to NLP and Computer Vision: Text and image processing basics

Explainable AI (XAI): Model interpretability and feature importance

Machine Learning Applications: Real-world applications and case studies

Machine Learning Tools and Applications: Use of modern ML tools and platforms, Real-world applications and case studies,

Mini project based on Machine Learning.

Unit 5

Reinforcement Learning and Emerging Concepts

07 hours

Project Planning Concepts: Dataset selection, Project scheduling basics, Resource and computational cost estimation, Introduction to ML project lifecycle

Introduction to Reinforcement Learning: Agent, Environment, State, Action and Reward concepts

Reinforcement Learning Process: Exploration vs Exploitation, Reward optimization basics

Applications of Reinforcement Learning: Gaming, Robotics and automation

Emerging Concepts in ML: Transfer Learning basics, AutoML basics, Future trends in Machine Learning

Ethical and Practical Challenges in ML: Bias, fairness, privacy and responsible use of Machine Learning systems.

Total Lecture Hours

45 hours

Textbook:

Authors

1.Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow:Concepts, Tools, and Techniques to Build Intelligent Systems, Third Edition (Full Colour Print)

Aurelian Geron,

2. Pattern Recognition and Machine +Learning, Springer-Verlag New York Inc

Christopher M. Bishop

3.Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press, 4th edition (2020)

Ethem Alpaydin

Reference Books:

Authors

1.Machine Learning, McGraw Hill Education, 1 July 20172

Tom M. Mitchell

2.An Introduction to Artificial Intelligence and Machine Learning, S Chand Publishing (2024)

Manikandan
Panneerselvam

Self-Study Content Links:

Duration (in Hrs)



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



MOOCs	NPTEL: Introduction to Machine Learning – IIT Madras NPTEL: Introduction to Machine Learning – IIT Kharagpur NPTEL YouTube Playlist – Machine Learning Basics https://www.youtube.com/watch?v=r4sgKrRL2Ys&list=PL1xHD4vteKYVpaliiy295pg6_SY5qznc77 NPTEL: Machine Learning Course	37 Min 13 Min 30 Sec 15 Min 27 Sec 28 Min 44 Sec
Video Lectures	YouTube: Scikit-learn and ML Algorithms Tutorials- NPTEL: Deep Learning – IIT Ropar https://www.youtube.com/watch?v=Mubj_fqiAv8&list=PLeo1K3hjS3uu7CxAcxVndI4bE_o3BDtO SWAYAM Plus: Prompt Engineering Course https://www.youtube.com/watch?v=J4Wdy0Wc_xQ&list=PLZoTAE LRMXVMdJ5sqbCK2LiM0HhQVWNzm&utm_source=chatgpt.com https://www.youtube.com/watch?v=JgvyzIkgxF0&list=PLKnIA16_RmvYsvB8ylwX5PX0J9j-bdC4x&utm_source=chatgpt.com	1 Hrs 33 Min 18 Min 49 Sec 30 Hrs 9 Min 53 Sec 16 Min 26 Sec
Web References	Scikit-learn Documentation TensorFlow Official Documentation OpenAI Spinning Up in Reinforcement Learning IBM Machine Learning Concepts and Applications Google AI and Responsible AI Resources	

Course Code: DMCA0255			Course Name: Object Oriented Techniques using JAVA				L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)							0	0	6	3
Pre-requisite: Understanding of basic Java syntax, familiarity with object-oriented concepts (classes, objects, inheritance, polymorphism), and problem-solving skills										
Course Objectives:										
The objective of this course is to understand the object-oriented methodology, and its techniques to design stand alone and GUI applications using hands-on engaging activities.										
Course Outcome: After completion of this course students will be able to:								Bloom’s Knowledge Level (KL)		
CO1	Define the concepts of object-oriented programming.							K1		
CO2	Describe OOP principles and concepts of lambda expressions.							K6		
CO3	Analyze packages with different protection level resolving namespace collision and error handling concepts for uninterrupted execution.							K4		
CO4	Describe Concurrency control, I/O Streams, and Annotations concepts.							K6		
CO5	Explain GUI based application, Generics and Collections in Java to solve the real-world problem.							K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	-	-	-	-	-	1		
CO2	3	2	2	-	-	-	-	1		
CO3	3	3	3	2	-	-	-	2		
CO4	2	2	2	2	-	-	-	2		
CO5	3	3	3	3	2	-	-	3		
Course Contents / Syllabus										
Unit 1			BASICS OF JAVA PROGRAMMING						14 hours	
Object Oriented Programming: Introduction and Pillars of OOP with real life example, JVM architecture and its components. Control Statements: Decision Making, Looping and Branching, Argument Passing Mechanism: Command Line Argument, Console Input/Output Class and Object: Object Oriented Concept in Java, Object Reference, Constructor, Abstraction: Abstract Class, Defining Methods, Static Class and Methods, Garbage Collection and finalize () Method etc.										
Unit 2			OOPs FEATURES, ARRAYS AND LAMBDA EXPRESS IONS						14 hours	
Inheritance: Introduction and Types of Inheritance in Java, Implementing Multiple Inheritance, Interface, and it uses, Access Modifiers, Constructors in inheritance, Use of “this” and “super” keyword Polymorphism: Introduction and Types, Overloading and Overriding Lambda expression: Introduction and Working with Lambda Variables Arrays: Introduction and its Types										
Unit 3			PACKAGES, EXCEPTION HANDLIN G AND STRING HANDLING						14 hours	
Packages: Introduction and Types, Access Protection in Packages, Import and Execution of Packages. Exception Handling: Introduction and Types, Exceptions vs. Errors, Handling of Exception Finally, Throws and Throw keyword, Multiple Catch Block, Nested Try and Finally Block. String Handling: Introduction and Types, Operations, Immutable String, Method of String class, String Buffer and String Builder class.										
Unit 4			CONCURRENCY IN JAVA AND I/O STREAM						14 hours	
Threads: Introduction and Types, Creating Threads, Thread Life- Cycle, Thread Priorities, Daemon Thread, Runnable Class, Synchronizing Threads etc. I/O Stream: Introduction and Types, Common I/O Stream Operations, Interaction with I/O Streams Classes. Annotations: Introduction, Custom Annotations and Applying Annotations.										
Unit 5			V GUI PROGRAMMING, GENERIC S AND COLLECTIONS						16 hours	

Programming: Introduction and Types, Swing, Components and Containers, Layout Managers and User- Defined Layout and Event Handling concept.

Generics: Introduction to Generic Classes, Initializing a Generic Object, Generic Cell Driver Class, Generic Methods, Use an enumerated type.

Collections: Introduction, Using Method References, Using Wrapper Class, Using Lists, Sets, Maps and Queues, Collection using Generics, Iterators.

Total Lecture Hours | **72 hours**

Textbook:

S. No	Book Title	Author
1.	Java: The Complete Reference	McGraw-Hill Education, Herbert Schildt, 12th Edition, 2021
2.	Core Java: An Integrated Approach	Dreamtech Press, R. Nageswara Rao, 1st Edition, 2008
3.	Programming with Java	McGraw-Hill Education, E. Balagurusamy, 6th Edition, 2019

Reference Books:

S. No	Book Title	Author
1.	Schaum's Outline of Programming with Java	McGraw-Hill Education, John R. Hubbard, 2nd Edition, 2004
2.	Core Java Volume I – Fundamentals	11th Edition, Cay S. Horstmann, Prentice Hall, 2018

NPTEL/ YouTube/ Faculty Video Link:

MOOCs	https://infyspringboard.onwingspan.com/web/en/viewer/html/lex_auth_01350158723828121612342	1 Hrs
Video Lectures	https://www.youtube.com/watch?v=7GwptabrYyk https://www.youtube.com/watch?v=6T_HgnjoYwM https://www.youtube.com/watch?v=Gso7VHo3c7 https://www.oreilly.com/videos/object-oriented-programming-with/9780136798163/ https://www.classcentral.com/course/youtube-java-full-course-for-beginners-2025-core-java-oops-programs-512621	1 Hrs 30 Min 2 Hrs 1 Hrs 4 Hrs 31 Min 10 Hrs 52 Min
Web References	https://www.javatpoint.com/java-oops-concepts https://www.w3schools.com/java/ https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/ https://dev.java/learn/ https://www.tutorialspoint.com/java/java_object_classes.htm	



LAB Course Code: DMCA0255				LAB Course Name: Object Oriented Techniques using JAVA Lab				L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)								0	0	6	3
Pre-requisite: Understanding of basic Java syntax, familiarity with object-oriented concepts (classes, objects, inheritance, polymorphism), and problem-solving skills											
Course Objectives:											
The objective of this course is to understand the object-oriented methodology, and its techniques to design stand alone and GUI applications using hands-on engaging activities.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Implement object-oriented programming concepts.							K3			
CO2	Demonstrate the Java programs using OOP principles and implement the concepts of lambda expressions.							K3			
CO3	Implement packages with different protection level resolving namespace collision and the error handling concepts for uninterrupted execution of Java program.							K3			
CO4	Develop Concurrency control, I/O Streams, and Annotations concepts by using Java program							K5			
CO5	Design and develop the GUI based application, Generics and Collections in Java to solve the real-world problem.							K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	2	2	2	-	-	-	1		
CO2		3	2	2	2	-	-	-	1		
CO3		3	3	3	3	-	-	-	2		
CO4		3	3	3	3	-	-	-	2		
CO5		3	3	3	3	2	-	-	3		
List Of Practical's (Indicative & Not Limited To)											
S.No	Name of Experiments/ Programs									CO	
1	Write Programs Compile and run first java file Byte Code and class file									CO1	
2	Program to display default value of all Primitive data types									CO1	
3	Implement the code using main () method to calculate and print the Total and Average marks scored by a student from the input given through the command line arguments.									CO1	
4	Assume that four command line arguments name, marks1, marks2, marks3 will be passed to the main () method in the below class with name Total and Avg Marks.									CO1	
5	Write code which uses if-then-else statement to check if a given account balance is greater or lesser than the minimum balance. Write a class Balance Check with public method check Balance that takes one parameter balance of type double. Use if-then- else statement and print Balance is low if balance is less than 1000. Otherwise, print Sufficient balance.									CO1	
6	A class Number Palindrome with a public method is Number Palindrome that takes one parameter number of type int. Write a code to check whether the given number is palindrome or not. For example, Command Arguments: 333333 is a palindrome.									CO1	
7	Write a class Fibonacci Series with a main method. The method receives one command line argument. Write a									CO1	

	program to display Fibonacci series i.e. 0 1 1 2 3 5 8 13 21	
8	Write a Java Program to find the Factorial of a given number.	CO1
9	Java Program to create a class, methods and invoke them inside main method	CO1
10	Write a Java program to illustrate the abstract class concept. Create an abstract class Shape, which contains an empty method number Of Sides (). Define three classes named Trapezoid, Triangle and Hexagon extends the class Shape, such that each one of the classes contains only the method Number of Sides (), which contains the number of sides in the given geometrical figure. Write a class Abstract Example with the main() method, declare an object to the class Shape, create instances of each class and call number Of Sides() methods of each class.	CO1
11	Java program to illustrate the static field in the class.	CO2
12	Java Program to illustrate static class.	CO2
13	Java program to explicitly implement garbage collection by using the finalize() method.	CO2
14	Java program to implement Single Inheritance.	CO2
15	Java program to implement multi-level Inheritance.	CO2
16	Java program to implement a constructor and constructor overloading	CO3
17	Write a java program to access the class members using super keyword.	CO3
18	Java program to access the class members using this keyword.	CO3
19	Implement an interface named Mountain Parts that has a constant named TERRAIN that will store the String value "off_road". The interface will define two methods that accept a String argument name new Value and two that will return the current value of an instance field. The methods are to be named: get Suspension, set Suspension, get Type, set Type.	CO3
20	Java program to demonstrate nested interface inside a interface	CO3
21	Java program to demonstrate nested interface inside a class.	CO3
22	Java program implement method overloading.	CO3
23	Java program to implement method overriding.	CO3
24	Java program to implement lambda expression without parameter.	CO4
25	Java program to implement lambda expression with single parameter.	CO4
26	Java program to implement lambda expression with multi parameter.	CO4
27	Java program to implement lambda expression that iterate list of objects	CO4
28	Java program to define lambda expressions as method parameters.	CO4
29	Write a class Count Of Two Numbers with a public method compare Count Of that takes three parameters one is arr of type int[] another two are arg1 and arg2 are of type int and returns true if count of arg1 is greater than arg2 in arr. The return type of compare Count of should be boolean. Assumptions: arr is never null arg1 and arg2 may be same	CO4
30	Java program to show the multiplication of two matrices using arrays.	CO4
31	Java Program to search an element using Linear Search	CO4
32	Java program to search an element using Binary Search	CO4
33	Java Program to sort element using Insertion Sort	CO4
34	Java Program to sort element using Selection Sort – Largest element Method	CO4
35	Java program to Sort elements using Bubble Sort	CO4
36	Java program to create user defined package	CO4
37	Java Program to create a sub- classing of package.	CO4
38	Implement the following: Import package. *; import package. classname; Using fully qualified name.	CO4
39	.Implement and demonstrate package names collision in java.	CO4
40	Java program to handle and Arithmetic Exception Divided by zero	CO4

41	Java Program to implement User Defined Exception in Java	CO4
42	Java program to illustrate finally block	CO4
43	Java program to illustrate Multiple catch blocks	CO4
44	Java program for creation of illustrating throw	CO4
45	Java program to print the output by appending all the capital letters in the input string.	CO5
46	Java program that prints the duplicate characters from the string with its count.	CO5
47	Java program to check if two strings are anagrams of each other	CO5
48	Java Program to count the total number of characters in a string	CO5
49	Java Program to count the total number of punctuation characters exists in a String	CO5
50	Java Program to count the total number of vowels and consonants in a string	CO5
51	Java Program to show. equals method and == in java	CO5
52	Given a string, return a new string made of n copies of the first 2 chars of the original string where n is the length of the string. The string may be any length. If there are fewer than 2 chars, use whatever is there. If input is "Wipped" then output should be "WiWiWiWiWi".	CO5
53	Given two strings, a and b, create a bigger string made of the first char of a, the first char of b, the second char of a, the second char of b, and so on. Any leftover chars go at the end of the result. If the inputs are "Hello" and "World", then the output is "HWeolrllod".	CO5
54	Java program to show the usage of string builder.	CO5
55	Java program to show the usage of string buffer.	CO5
56	Creating and Running a Thread	CO5
57	Implementing Runnable Interface	CO5
58	Synchronizing Threads with lock	CO5
59	Synchronizing Threads without lock	CO5
60	Java program to implement even and odd threads by using Thread class.	CO5
61	Java program to implement even and odd threads byusing Runnable interface.	CO5
62	Java program to synchronize the threads byusing Synchronize statements and Synchronize block.	CO5
63	Demonstrate the concept of type annotations in the JAVA programming language.	CO5
64	Java program to implement that read a character stream from input file and print it into output file.	CO5
65	Write a Java program that reads a text file and adds line numbers to each line. The program should create a new file with the line numbers added to the beginning of each line.	CO5
66	Java program to implement that merge the content of two files (file1.txt, file2.txt) into file3.txt.	CO5
67	Write a Java program that reads two binary files and compares them byte by byte to determine if they are identical. Display a message indicating whether the files are the same or different.	CO5
68	Write a Java program that reads the contents of one file and copies them to another file.	CO5
69	Write a Java program that reads a text file and counts the number of words in it.	CO5
70	Write a Java program that reads a text file and counts the frequency of each word in it.	CO5
71	Program to create a frame with three buttons.	CO5
72	Program to display message with radio buttons.	CO5
73	Program to display "All the Best" in 5 different colors on screen.	CO5
74	Program to implement event handling in a button "OK"	CO5
75	Java Program to implement Border Layout	CO5
76	Java Program to implement Grid Layout	CO5
77	Java Program to implement Box Layout	CO5
78	Java Program to implement Card Layout	CO5
79	Java program to implement Generic class	CO5



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



80	Java program to illustrate Generic methods	CO5
81	Java program to implement wild card in generics	CO5
82	Java program to implement of methods of Hash Set	CO5
83	Java Program to implement methods available in Hash Map class	CO5
84	Program to add, retrieve, and remove element from Array List	CO5
85	Create a method which can accept a collection of country names and add it to Array List with generic defined as String and return the List.	CO5
86	Create a method which can create a Hash Set containing values 1-10. The Set should be declared with the generic type Integer. The method should return the Set.	CO5
87	Develop a java class with a method store Even Numbers (int N) using Array List to store even numbers from 2 to N, where N is a integer which is passed as a parameter to the method store Even Numbers (). The method should return the Array List (A1) created.	CO5
88	Create a method that accepts the names of five countries and loads them to an array list and returns the list.	CO5
89	Java program to implement auto boxing	CO5
90	Java program to implement unboxing	CO5
		Total Hours: 72 hrs.

LAB Course Code: DMCA0252		LAB Course Name: Database System Lab				L	T	P	C
Course Offered in: MCA 1st Year (2nd Semester)						0	0	4	2
Pre-requisite: Students are expected to be familiar with basic computer knowledge, as well as the fundamentals of mathematics and logical reasoning.									
Course Objectives:									
The objective of the course is to introduce about database management systems, with an emphasis on how to organize, maintain and retrieve -efficiently, and effectively - information in relational & non- relational databases									
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)	
CO 1	Design ER and EER diagram of database for solving the real-world problems.								K2
CO 2	Apply and analyze the Structured Query Language (SQL) to solve the complex queries and implement normalization.								K6
CO 3	Implement the operators in complex queries and apply database connectivity for different applications								K6
CO 4	Discuss PL/SQL programs to solve complex problems in databases								K2
CO 5	Design and implement relational and non-relational database for the need of the real-world project.								K5
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	3	2	-	-	-	2	
CO2	3	3	3	3	-	-	-	2	
CO3	3	3	3	3	1	-	-	2	
CO4	3	3	3	2	-	-	-	2	
CO5	3	3	3	3	2	1	-	3	
List Of Practical's (Indicative & Not Limited To)									
S.No	Name of Experiments/ Programs								CO
1	Creating ER Diagram for the company Database. Company databases have entities like employee, departments, projects, and dependents also implement the relationship and cardinalities between the entities with their relevant attribute								CO1
2	Design an ER diagram for a travel agency that includes entities such as travelers, bookings, destinations, and itineraries. Also implement the relationship and cardinalities between the entities with their relevant attribute								CO1
3	Convert Company ER Model to Relational Model (Represent entities and relationships in tabular form, represent attributes as columns, identifying keys).								CO1
4	Convert Travel Agency ER Model to Relational Model (Represent entities and relationships in tabular form, represent attributes as columns, identifying keys). Convert Travel Agency ER Model to Relational Model (Represent entities and relationships in tabular form, represent attributes as columns, identifying keys).								CO1
5	Data Definition Language Queries: Create Tables STUDENT, BOOK, TRANS. STUDENT (Roll no, Name, Branch, Year, Section, Hostel, F_name, Address) BOOK (Bookid, Title, Author, Publisher, Cost, Copies) TRANS (Roll no, Bookid, date issue, date return, fine 1. Add a new attribute state in student table 2. Remove attribute address from student table								CO2

	- Modify the data type of state attribute - Change the name of attribute hostel to resident - Change a table's name, student to stud - Use truncate to delete the contents of trans table - Remove the book table from database	
6	Data Manipulation Language Queries - Insert at least 10 records in tables student, book, and trans - Show the contents in tables student, book, and trans - Find the name and branch of all students - Find the name and roll no of all students who stay in hostel - Find all distinct branches of students - Delete the record of the student whose roll no is 204001 - Delete all records of student table - Delete all records of students whose section starts with capital A. - Find the student names which have 'lk' in any position - Find the student's name where 'R' is in the second position - Find the name of student whose name starts with 'V' and ends with 'A' - Change the State of all students to 'BOMBAY' - Change the state of student 'Vandana' to 'Goa' - Apply arithmetic operators on cost column of book table for the book which has book id = 1101	CO2
7	Queries with Constraints - Create the book table with Primary Key Constraint - Create trans table with foreign key Constraint - Create an Employee table with UNIQUE Constraint - Create Employee Table with Check Constraints - Create Supplier table with Default Constraint	CO2
8	Queries on TCL - Create Save points - Rollback to Save Points - Use Commit to save on	CO2
9	Aggregate Functions: - Find the minimum, maximum, average and sum of costs of books - Count the total number of books present - Retrieve the average cost of all books authored by 'navathe'	CO2
10	String, Math and Advanced Functions Implement the Following Functions: - ASCII() - CHAR_LENGTH() - CONCAT() - LCASE() - LOWER() - REPEAT() - REVERSE() - STRCMP() - ABS(X) - MOD(X,Y) - SIGN(X) - POWER(X,Y) - ROUND(X)	CO2

	- SQRT(X) - BIN() - COALESCE() - IF() - LTRIM - RTRIM - LPAD - RPAD - INITCAP	
11	Queries on GROUP BY, HAVING AND ORDER BY Clauses - Display total costs of books by each author - Find the branch and the number of students in that branch for branches which have more than 1 student - Find all books sorted by title in ascending order and cost in descending order - Find the branch and the number of students in that branch	CO2
12	Queries on Operators - Find the title, author and cost of books which have cost equal to or greater than 200 and less than or equal to 600. - Find the name, rollno and branch of students who are in 'CSE' branch or 'IT' branch - Find the title, author, and cost of book for which cost is between 200 and 600 - Find the title and author of book, which has the word 'NET' anywhere in its title. - Find the bookid and title of books with title either 'OS' or 'DBMS' - List the students who issued books on '1st may 2000', '12 JAN 2021', '17 dec 2000', '10 Jan 2021' - Display all books which have cost more than the cost of all books authored by 'Yash' - Find all the distinct costs of books	CO2
13	Join Operators - Perform Inner join on two tables - Perform Natural Join on two tables - Perform Left Outer Join on tables - Perform Right Outer join on tables - Perform Full Outer Join on tables	CO2
14	Set Theory Operators - Show the use of UNION operator with union compatibility - Show the use of intersect operator with union compatibility - Show the use of minus operator with union compatibility - Find the cartesian product of two tables	CO2
15	Queries on Set Theory Operators - List all books except 'Navathe' and 'Tannenbaum' in ascending order of costs - Display all books that have not been issued so far - To display the students name who have been issued DBMS book by NAVATHE and OS book by TANNENBAUM. - To display the students name who have been issued DBMS book by NAVATHE OR OS book by TANNENBAUM	CO2
16	Complex Queries - Display all books that have been issued so far - To display all the students of CSE IN year 2021 who are staying in the hostel. - To display students name who have issued OS book by Tannenbaum - To display the names of students who have not issued any book so far - To display the names of students who have issued at least one book so far. - To display students, name along with the book issued to them - Find the names of students who have paid fine Rs1000 for the book 'OS in Depth'.	CO3

	8. Retrieve the name of students who have issued the book which has the maximum cost. 9. Retrieve the names of students who have issued all books written by 'Korth'	
17	Queries on Views - Create a view of student table - Find roll no and name from the created view where hostel is 'YES' - Create a view selecting roll no, name, branch, year and section from student table - Insert a row in the created view - Find all data in the created view - Update the created view by changing the name to 'GOGUL' for student whose roll no is 101 - Compare the data of created view and the original table student - Delete the record of student whose roll no is '101' from the created view - Remove the view from database	CO3
18	Queries on Sequence, Index - Set the column to ROWNUM of a table - Create a sequence and set a column of a table to the created sequence. - Create an Index on the customer table	CO3
19	PL/SQL Programs - Write a PL/SQL Code to add two numbers - Write a PL/SQL code for Fibonacci series - Write a PL/SQL Code for greatest of 3 numbers - Write a PL/SQL code for area and circumference of a circle	CO4
20	PL/SQL Programs on Cursors - Write a Program using CURSOR to display ssn and salary of 1st record of employee - Write a program using cursors to display the ssn and salary of all employees and then print the count of employees	CO4
21	PL/SQL Programs on Triggers, Procedures and Functions - Write a Program using TRIGGER on UPDATE - Write a command to See the effect of trigger - Write a Program using PROCEDURE to increase the salary by Rs.1000 for Employee whose ssn is passed as an argument. - Write a procedure to update the address of an employee whose ssn and address are passed as arguments and the procedure returns the name of employee whose address is updated. - Write a function to return the total number of employees - Write a function to return the department number for which the department name is passed - Write a function to find the total sum of salaries of all employees. - Write a procedure to insert record in the department table - Write a code using EXCEPTION	CO4
22	PL/SQL Programs on Implicit Cursors - Insert a record using %ROWTYPE - Write a code using %NOTFOUND, %FOUND, %ROWCOUNT - Write a code using %TYPE	CO4
23	Mongo DB Queries - Create a collection. - Insert documents into Created Collection - Use insertMany() to insert more records - View the inserted records, raw and formatted - Select all documents in collection - Find count of all customers - Show the records which have age equal to 18 - Find all records which have fees between 2500 and 4500 - retrieve all documents from the cust collection where status equals either "A" or "P"	CO5

	10. Retrieve all documents where grade is equal to 'F' AND (fees is less than 3000 OR name starts with letter 'J') 11. Retrieve all documents where grade is equal to F OR fees is less than 4000 12. Update record with id 1, incrementing their fees by 50 13. Update the record of jack, set address to 'Delhi' and phoneno to '11221122' 14. Delete all records which have fees greater than 3000 15. Display only the grade and fees. 16. Get the grade, fees and custname of all records and sort by custname in ascending order. 17. Sort the Customers on their fees by descending order and get only first 2 records only 18. Update the postal code of 1st record and view it 19. Select from the cust collection all documents where the grade equals "F": 20. Retrieve the document with exact value '5' 21. Retrieve documents where grade field contains values in given set. 22. Retrieve documents where grade field does not contain values in given set. 23. Retrieve all documents where grade is equal to "f" and fees is greater than or equal to 2000 and less than or equal to 4000. 24. Retrieve all documents which have grade not "F" nor "P." 25. Retrieve all documents where fees are not greater than or equal to 3000 26. Retrieve all documents where fees exist and is greater than or equal to 3000 27. Retrieve all documents which have fees type double 28. Retrieve all documents that have fees of type number 29. Retrieve all documents when we divide fees by 200 and remainder is 100 30. Retrieve all documents that have regular expression 'o' in the custname field 31. Retrieve all documents that have fees 2000 or 4300	
24	Connectivity with Database using Java or Python.	CO5
25	Case Study Implementation of case Study on different domain 1. E-commerce Platform 2. Inventory Management 3. Railway System 4. Hospital Data Management 5. Voice-based Transport Enquiry System 6. SMS-based Remote Server Monitor system Banking System	
Total Hours: 30 hrs.		

LAB Course Code: DMCA0253				LAB Course Name: Data Structures Lab				L	T	P	C
Course Offered in: MCA 1 st Year (2 nd Semester)								0	0	4	2
Pre-requisite: Students are expected to have knowledge of programming languages, along with a foundation in mathematics and problem-solving ability.											
Course Objectives:											
This course focuses on the implementation and application of linear and non-linear data structures using programming techniques. It develops problem-solving skills through hands-on practice with data structures, algorithms, and complexity analysis for efficient Computational solutions.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO 1	Ability to understand a systematic approach to organizing, writing, and debugging C programs								K2		
CO 2	Ability to implement sorting and searching algorithms using relevant data structures								K4		
CO 3	Implement Stack, Queue, and linked list								K5		
CO 4	Ability to implement linear and non-linear data structure operations using C programs								K5		
CO 5	Solve complex problems using non-linear data structures like trees and graph along with an understanding of searching and sorting								K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	2	-	-	-	1			
CO2	3	3	3	3	-	-	-	2			
CO3	3	3	3	3	-	-	-	2			
CO4	3	3	3	3	-	-	-	2			
CO5	3	3	3	3	-	-	-	2			
List Of Practical's (Indicative & Not Limited To)											
S.No	Name of Experiments/ Programs										CO
1	Construct a Code to find the maximum element in an array.										CO1
2	Construct a Code to calculate the sum of all elements in an array										CO1
3	Construct a Code to reverse the elements of an array.										CO1
4	Construct a Code to check if an array is sorted in ascending order.										CO1
5	Construct a Code to count the occurrence of a specific element in an array.										CO1
6	Construct a Code creation and traversal of 2D Array in row major and column major order										CO1
7	Construct a code to print the transpose of a given matrix using function										CO1
8	Program to find if a given matrix is Sparse or Not and print Sparse Matrix										CO1
9	Construct a code to implement Linear Search										CO1

10	Construct a code to implement Binary Search	CO1
11	Implementation of stack using a list	CO2
12	Construct a code to Infix to postfix conversion using a stack	CO2
13	Construct a code for Balanced parentheses checker using a stack	CO2
14	Implement Reverse a string using a stack.	CO2
15	Implement Binary Search using Recursion.	CO2
16	Construct a code program to print Fibonacci Series using Recursion.	CO2
17	Queue implementation using a list	CO2
18	Construct a code for Simulating a printer queue using a queue.	CO2
19	Construct a code for Implementing a circular queue.	CO2
20	Implement queue using stack	CO2
21	Create a single linked list and perform basic operations (insertion, deletion, traversal).	CO3
22	Create a double linked list and perform basic operations (insertion, deletion, traversal)	CO3
23	Create a circular linked list and perform basic operations (insertion, deletion, traversal).	CO3
24	Reverse a single linked list.	CO3
25	Check if a linked list is palindrome.	CO3
26	Find the middle element of a single linked list.	CO3
27	Find the middle element of a double linked list.	CO3
28	Merge two sorted single linked lists.	CO3
29	Detect and remove a loop in a circular linked list.	CO3
30	Construct a code to Insert, Delete, and search and update a data in Binary Search Tree (BST)	CO4
31	Construct a code for Tree Traversal (Preorder, Inorder, Postorder)	CO4
32	Construct a code Count the number of Leaves in a Binary Tree	CO4
33	Construct a code to find the Height of a Binary Tree	CO4
34	Construct a code to print all Paths from the Root to Leaf Nodes in a Binary Tree	CO4
35	Construct a code to convert a Binary Tree to its Mirror Tree	CO4
36	A program to check if a Binary Tree is a Binary Search Tree (BST)	CO4
37	Construct a code to check if a Binary Tree is a Balanced Binary Tree	CO4
38	Construct a code to represent graph using adjacency matrix and adjacency list	CO5
39	Implement BFS and DFS algorithm.	CO5
40	Implement the minimum cost spanning tree	CO5
41	Implement bubble sort in a non-recursive way.	CO5
42	Implement selection sort in a non-recursive way.	CO5
43	Implement insertion sort in a non-recursive way.	CO5
44	Implement Merge sort in a non-recursive way.	CO5
45	Implement Merge sort in a recursive way.	CO5
46	Implement Quick Sort in a recursive way.	CO5

47	Array-based Student Performance Analysis System	C05
48	Design Decision Tree Classifier for Disease Diagnosis using a tree data structure.	C04
Total Hours: 30 hrs.		

LAB Course Code: DMCA0257		LAB Course Name: Workplace Communication Competence 2				L	T	P	C
Course Offered in: MCA 2 nd Year (2 nd Semester)						0	0	4	2
Pre-requisite: Comprehension of basic English language. The students should have completed Workplace Communication Competence course in first semester									
Course Objectives:									
To improve proficiency in Business English to the intermediate level of CEFR (Common European Framework of Languages), to introduce the key concepts of life skills and train for career enhancement and to impart Business Communication Skills									
Course Outcome: After completion of the course, the student will be able to						Bloom's Knowledge Level (KL)			
CO1	Apply key concepts of life-skills and train for career roles					K4			
CO2	Enhance effective listening skills					K6			
CO3	Acquire fluency and spontaneity while speaking professionally					K3			
CO4	Understand and analyze complex written texts					K4			
CO5	Compose clear and detailed texts on a variety of topics					K6			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	2	2	3	-	2	2	2	3	
CO2	-	2	-	-	3	-	-	2	
CO3	-	2	2	-	3	-	-	2	
CO4	2	2	2	-	-	-	-	2	
CO5	2	2	3	-	-	-	-	2	
List Of Practical's									
S.No	Name of Experiments/ Programs								CO
1	Students will know the course structure and examination pattern. Students will know how to meet, greet. and strike a conversation								CO1
2	Students will learn through listening to conversations and understand common vocabulary and expressions in short, clear dialogues.								CO1
3	Students will learn to speak on personal interest and practice using professional phrases.								CO1
4	Students will listen to their peers reading aloud, write down the gist, and repeat what is read.								CO1
5	The students will understand and learn how to draft proper responses to various professional chat messages.								CO1
6	Students will practice listening to given audio clips and understand the importance of clear communication and active listening.								CO2
7	Students will demonstrate effective communication, active listening, and adaptability in various scenarios								CO2
8	Students will practice sample questions and answers for placements – offline & online.								CO2
9	Students will develop and improve their critical thinking and practice analytical writing.								CO2
10	Students will be provided with workplace situations and practice building their vocabulary by learning to use a variety of words.								CO2



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



11	Students will be practicing their active listening by analyzing TED Talks on subjects related to technology/science.	CO3
12	Students will be practicing their active listening by analyzing TED Talks on subjects related to technology/science.	CO3
13	Students will engage in meaningful conversations, build connections, and create a positive networking	CO3
14	The students will practice common interview questions.	CO3
15	Students will learn to write coherent sentences. They will also practice writing sentences using professional adjectives for specific purposes.	CO3
16	Students will enhance their listening skills, by listening to native speakers and learn to convey information accurately.	CO4
17	The students will practice professional writing skills through verbal prompts.	CO4
18	Students will enhance their ability to express their opinions, actively listen to others, and engage in constructive discussions to develop well-rounded perspectives.	CO4
19	Students will practice and enhance their reading skills, through reading select blog posts on technology and innovative businesses.	CO4
20	Students will learn to write about their career objectives, qualifications, and key skills in the form of a professional profile	CO4
21	The students will develop spontaneous thinking, and the ability to express their ideas effectively.	CO5
22	Students will practice effective communication strategies, develop empathy, and understand, and improve their speaking skills and ability to handle real-life situations through role-playing exercises.	CO5
23	The students will hone their presentation skills to develop and enhance effective speaking and non-verbal skills.	CO5
24	The students will learn co-ordination and improve their group presentation skills.	CO5
25	The students will discuss their key take away from the course.	CO5
		Total Hours: 30 hrs.

LAB Course Code: DMCA0211P		LAB Course Name: CRM Administration Lab		L	T	P	C
Course Offered in: MCA 2nd Year (2nd Semester)				0	0	2	1
Pre-requisite: Creative thinking and which is being used by the creative talent in your business areas.							
Course Objectives:							
To make the students understand the organizational need, benefits and process of creating long-term value for individual customers. To disseminate knowledge regarding the concept of e-CRM and e- CRM technologies. To enable the students to understand the technological and human issues relating to the implementation of Customer Relationship Management in the organizations.							
Course Outcome: After completion of the course, the student will be able to.					Bloom's Knowledge Level (KL)		
CO1	Describe the working of Trailhead.				K2		
CO2	Describe the importance of Salesforce and its features.				K2		
CO3	Implement the validations in Data modelling.				K3		
CO4	Describe the importance of user management.				K2		
CO5	Identify and implement Security concepts in the industry.				K2, K3		

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
C01	2	1	-	2	-	-	-	2
C02	3	2	1	2	-	-	-	2
C03	3	3	3	3	-	-	1	2
C04	2	2	1	2	1	-	2	2
C05	3	3	2	3	-	-	3	3

List Of Practical's (Indicative & Not Limited To)

S.No	Name of Experiments/ Programs	CO
1	Quick Start: Lightning App Builder	CO1
2	Prepare Your Salesforce Org for Users	CO1
3	Customize an Org to Support a New Business Unit	CO2
4	Protect Your Data in Salesforce	CO2
5	Customize a Sales Path for Your Team	CO3
6	Setup the service Console	CO3
7	Build a discount approval process	CO3
8	Quick start process builder	CO3
9	Build a simple fl	CO4
10	Build a battle station App	CO4
11	Customize a Salesforce Object	CO4
12	Create Reports and Dashboards for Sales and Marketing Managers	CO5
13	Improve Data Quality for Your Sales and Support Teams	CO5
14	Create a Process for Managing Support Cases	CO5

Total Hours: 15 hrs.

LAB Course Code: DMCA0212P			LAB Course Name: Fundamentals of Digital Marketing and Analytics Lab			L	T	P	C
Course Offered in: MCA First Year						0	0	2	1
Pre-requisite: Basic Knowledge of Computer Science									
Course Objectives:									
To provide hands-on experience in applying digital marketing strategies and using analytics tools. Students will learn to analyze data, optimize campaigns, and implement digital marketing techniques for practical scenarios.									
Course Outcome: After completion of the course, the student will be able to.						Bloom's Knowledge Level (KL)			
CO1	Prepare a spreadsheet for data manipulation, formula creation, and advanced functions like CONCATENATE, VLOOKUP, HLOOKUP, MATCH, and COUNTIF.					K3			
CO2	Develop skills in sorting, filtering, text-to-columns, and data validation to effectively analyze and interpret data for marketing insights.					K5			
CO3	Create, format, and interpret various types of charts to visualize data, enhance presentations, and support decision-making in digital marketing campaigns.					K5			
CO4	Utilize PivotTables for summarizing, analyzing, and presenting complex data sets, including customization, manipulation, and integration with Pivot Charts.					K4			
CO5	Prepare spreadsheets for navigation, sheet protection, macro recording,					K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	2	3	-	-	-	2	
CO2	3	3	3	3	-	-	-	2	
CO3	2	3	2	3	-	-	-	2	
CO4	3	3	3	3	-	-	-	2	
CO5	2	1	2	3	-	1	-	2	
List Of Practical's (Indicative & Not Limited To)									
S.No	Name of Experiments/ Programs								CO
1	Creating Formulas: Using Formulas, Formula Functions – Sum, Average, if, Count, max, min, Proper, Upper, lcr, Using AutoSum								CO1
2	Columns & Rows: Selecting Columns & Rows, Changing Column Width & Row Height, Autofitting Columns & Rows, Hiding/Unhiding Columns & Rows, Inserting & Deleting Columns & Rows, Cell, Address of a cell, Components of a cell – Format, value, formula, Use of paste and paste special								CO1
3	Functionality Using Ranges: Using Ranges, Selecting Ranges, Entering Information into a Range, Using AutoFill								CO1
4	Concatenate, VLOOKUP, H lookup, Match, Count if, Text, Trim								CO1
5	Spreadsheet Charts: Creating Charts, Different types of charts, Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table								CO3
6	Data Analysis: Sorting, Filter, Text to Column, Data Validation								CO2
7	PivotTables: Creating PivotTables, manipulating a PivotTable, Using the PivotTable Toolbar, Changing Data Field, Properties, displaying a PivotChart, Setting PivotTable Options, Adding Subtotals to PivotTables								CO4
8	Spreadsheet Tools: Moving between Spreadsheets, Selecting Multiple Spreadsheets, Inserting and Deleting Spreadsheets Renaming Spreadsheets, Splitting the Screen, Freezing Panes, Copying and Pasting Data between Spreadsheets, Hiding, Protecting worksheets								CO5
9	Making Macros: Recording Macros, Running Macros, Deleting Macros								CO5
Total Hrs: 15hrs									

6	Implement categorical data encoding techniques using Label Encoding and One-Hot Encoding.	CO1
7	Split the dataset into training, validation, and testing datasets using Scikit-learn.	CO1
8	Implement Linear Regression for prediction on a sample dataset.	CO2
9	Implement Multiple Linear Regression using real-world datasets.	CO2
10	Implement Logistic Regression for binary classification problems.	CO2
11	Implement the K-Nearest Neighbors (KNN) classifier and analyze accuracy.	CO2
12	Implement a Naïve Bayes classifier for text or spam classification.	CO2
13	Implement a Decision Tree classifier and visualize decision boundaries/tree structure.	CO2
14	Implement a Random Forest classifier and compare performance with a Decision Tree.	CO2
15	Implement a Support Vector Machine (SVM) classifier on classification datasets.	CO2
16	Calculate evaluation metrics such as Accuracy, Precision, Recall, F1-Score, and ROC-AUC.	CO2
17	Perform Cross Validation and Hyperparameter Tuning using GridSearchCV.	CO2
18	Implement K-Means Clustering for customer segmentation problems.	CO3
19	Implement Hierarchical Clustering and plot dendrograms.	CO3
20	Implement DBSCAN clustering and compare with K-Means clustering.	CO3
21	Perform Principal Component Analysis (PCA) for dimensionality reduction.	CO3
22	Implement Apriori Algorithm for Market Basket Analysis.	CO3
23	Implement Bagging and AdaBoost ensemble learning techniques	CO4
24	Build a simple Recommendation System using collaborative filtering concepts.	CO4
25	Implement a basic Reinforcement Learning example using Q-Learning for path finding or game simulation.	CO5
		Total Hours: 15 hrs.