

**NOIDA INSTITUTE OF ENGG. & 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: 2022-2023)

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

Master of Computer Applications

MCA

EVALUATION SCHEME

SEMESTER- I

S.No	Subject Codes	Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	AMCA0101	Fundamentals of Computer And Programming in C	3	1	0	30	20	50		100		150	4
2	AMCA0102	Operating System	3	0	0	30	20	50		100		150	3
3	AMCA0103N	Professional Communication And Management Principles	2	0	0	30	20	50		100		150	2
4	AMCA0104Z	Computer System Organization	3	0	0	30	20	50		100		150	3
5	AMCA0105	Discrete Mathematics	3	0	0	30	20	50		100		150	3
6	AMCA0151	C Programming Lab	0	0	4				50		50	100	2
7	AMCA0152	Operating System Lab	0	0	4				50		50	100	2
8	AMCA0153N	Professional Communication Lab	0	0	4				50		50	100	2
9	AMCA0154	Computer Organization Lab	0	0	4				50		50	100	2
		MOOCs											
		TOTAL						250	200	500	200	1150	23

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

S. No.	Subject Code	Course Name	University/ Industry Partner Name	No. of Hours
1	AMC0049	Speak English Professionally: Inperson, Online and on phone	Georgia Technical University	16

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

Master of Computer Applications

MCA

EVALUATION SCHEME

SEMESTER-II

S. No	Subject Codes	Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	AMCA0201N	Object Oriented Programming with JAVA	3	1	0	30	20	50		100		150	4
2	AMCA0202	Database Management System	3	0	0	30	20	50		100		150	3
3	AMCA0203N	Data Structures and Analysis of Algorithm	3	1	0	30	20	50		100		150	4
4	AMCA0205	Design Thinking	3	0	0	30	20	50		100		150	3
5		Departmental Elective-I	2	0	0	30	20	50		50		100	2
6	AMCA0251N	Object Oriented Programming with JAVA Lab	0	0	4				50		50	100	2
7	AMCA0252	Database Lab	0	0	4				50		50	100	2
8	AMCA0253N	Data Structures Lab	0	0	4				50		50	100	2
9		Departmental Elective-I Lab	0	0	2				50			50	1
10	AMCANC0201	Cyber Security	2	0	0	30	20	50		50		100	
		MOOCs											
		TOTAL						250	200	450	150	1050	23

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

S. No.	Subject Code	Course Name	University/ Industry Partner Name	No. of Hours
1	AMC0050	Foundation: Data Everywhere	Offered by Google	20
2	AMC0051	Ask question to make Data Driven Decision	Offered by Google	18
3	AMC0052	Prepare Data for Exploration	Offered by Google	22
4	AMC0053	Facebook, Instagram and Snapchat Marketing	Digital Marketing Institute	12
5	AMC0054	Social Media and digital Marketing Fundamental	University Colorado Boulder	10
6	AMC0055	Twitter Linked In and You Tube Marketing	Digital Marketing Institute	13

PLEASE NOTE:-

Compulsory Audit Courses (Non Credit -AMCANC0201)

- All Compulsory Audit Courses (a qualifying exam) has no Credit.
- Total and obtained marks are not added in the Grand Total.

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

List of Departmental Electives--:

S. No.	Subject Code	Subject Name
Departmental Elective-I		
1	AMCA0214Z	Fundamentals of Digital Marketing and Analytics
2	AMCA0215Z	Fundamentals of Digital Marketing and Optimization
3	AMCA0216Z	CRM Administration
4	AMCA0218	Software Testing

S. No.	Subject Code	Subject Name
Departmental Elective-I Lab		
1	AMCA0214P	Fundamentals of Digital Marketing and Analytics Lab
2	AMCA0215P	Fundamentals of Digital Marketing and Optimization Lab
3	AMCA0216P	CRM Administration Lab
4	AMCA0218P	Software Testing Lab

MCA - FIRST YEAR FIRST SEMESTER

Course Code	AMCA0101	L	T	P	Credit
Course Title	Fundamentals of Computer and Programming in C	3	1	0	4
<p>Course objective:To understand basic concepts of C-programming language. Implement C programs to solve complex problems. Enhance debugging, analyzing and problem-solving skills. Create diversified solutions for real world applications using C language Acquire the knowledge of variable allocation and binding, conditional statement, control flow, types, function, pointer, parameter passing, array, structure and file handling to solve real world problems.</p>					
<p>Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.</p>					
Course Contents / Syllabus					
UNIT-I	Basic Programming concepts				8 hours
<p>Approaches to Problem Solving: Concept of Algorithms and Flow Chart. Programming Languages Classification, Translator and their types. Programming using C: Structure of C program, Overview of compilation and execution process in an IDE, transition from algorithm to program, Errors and their types, object and executable code, Tokens of C language: Keywords, identifiers, constant.</p>					
UNIT-II	Data types and Conditional Statements				8 hours
<p>Data type, Operators and their types, Arithmetic expressions and precedence: Operators, operator precedence and associativity, type conversion, mixed operands. 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. Arrays: Array notation and representation (one and two dimensional), manipulating array elements, 2-D arrays used in matrix computation.</p>					
UNIT-III	Functions and Pointers				8 hours
<p>Functions: Concept of Sub-programming, function, types of functions, passing parameters to functions: call by value, recursive functions, Storage: scope of variable, local and global variables, Nesting of Scope, Storage classes: Auto, Register, Static and Extern Pointers: defining and declaring pointer, pointer arithmetic and scaling, Pointer Aliasing, call by reference.</p>					
UNIT-IV	Strings and Structure				8 hours
<p>Strings: Introduction, initializing strings, accessing string elements, Array of strings, Passing strings to functions, String functions. 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.</p>					
UNIT-V	File handling and dynamic memory allocation				8 hours
<p>Dynamic Memory Allocation: Introduction, Library functions –malloc, calloc, realloc and free. Pre-processor directives: defining and calling macros, File inclusion, conditional compilation File Handling: Basics, File types, File operations, File pointer, File opening modes, File handling functions, File handling through command line argument, Record I/O in files.</p>					
<p>Course outcome: At the end of course, the student will be able to</p>					

CO 1	Develop simple algorithms for arithmetic and logical problems.	K ₂
CO 2	Implement and trace the execution of programs written in C language.	K ₁ ,K ₂ ,K ₄
CO 3	Implement conditional branching and iteration	K ₃
CO 4	Use function, and pointers to develop algorithms and programs.	K ₂ , K ₆
CO 5	Use searching and sorting algorithm to arrange data and use file handling for developing real life projects	K ₂ , K ₄

Text books :

(1) Herbert Schildt, "C: The Complete Reference", Osbourne McGraw Hill, 4th Edition, 2002.

(2) Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill

(3) Let Us C by Yashwant P. Kanetkar. BPB publication

(4) K.R Venugopal, "Mastering C", TMH

(5) Yashwant P. Kanetkar, "Working with C", BPB publication

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1 <https://nptel.ac.in/courses/106/104/106104128/>

Unit 2 <https://nptel.ac.in/courses/106/104/106104074/>

Unit 3 <https://nptel.ac.in/courses/106/102/106102066/>

Unit 4 <https://nptel.ac.in/courses/106/105/106105171/>

Unit 5 https://www.youtube.com/watch?v=IdXrCPzNnkU&list=PLJ5C_6qdAvBFzL9su5J-FX8x80BMhkPy1&index=4

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0102	L	T	P	Credit
Course Title	Operating System	3	0	0	3
Course objective: To learn the fundamentals of Operating Systems, the Process management and CPU scheduling algorithm, understand the various issues in process synchronization and different strategies for handling the Deadlock, understand the concepts of memory management policies and virtual memory, learn the file system implementation and mass storage management functions of operating systems.					
Pre-requisites: Students are expected to be familiar with Computer Organization					
Course Contents / Syllabus					
UNIT-I	Fundamental Concepts of Operating System				8 hours
Introduction: Operating System Structure- Layered structure, System Components, Operating system functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multi process Systems, Multithreaded Systems, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems. issues in operating system design. Application of OS in different domain					
UNIT-II	Concurrent Processes				8 hours
Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation, Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem, Producer Consumer problem, Readers/Writers problem. Inter Process Communication models and Schemes, Process generation.					
UNIT-III	CPU Scheduling and Deadlock				8 hours
CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Real-Time Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.					
UNIT-IV	Memory Management				8 hours
Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Memory Allocation: Allocation Strategies (First Fit, Best Fit, and Worst Fit), Fragmentation, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.					
UNIT-V	Input/Output and File System				8 hours
I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security. Features of different OS[Windows, Linux, Android],Comparative Study of Different OS, Case Study					
Course outcome: At the end of course, the student will be able to					
CO 1	Explain main components, services, types and structure of Operating Systems.				K2
CO 2	Apply the algorithms and techniques to handle the various concurrency control issues.				K3
CO 3	Compare and apply CPU scheduling algorithms for process execution.				K2

CO 4	Identify occurrence of deadlock and describe ways to handle it.	K3
CO 5	Explain and apply memory, I/O and disk management techniques.	K5
Text books :		
(1) Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 8th Ed., John Wiley, 2008.		
(2) William Stallings, Operating Systems: Internals and Design Principles. Prentice-Hall, 6th Ed., 2008.		
(3) AS Tanenbaum, Modern Operating Systems, 3rd Ed., Pearson, 2009.		
Link: NPTEL/ YouTube/ Faculty Video Link:		
Unit 1	https://nptel.ac.in/courses/106106144	
Unit 2	https://archive.nptel.ac.in/courses/106/105/106105214/	
Unit 3	https://www.youtube.com/playlist?list=PLsyIUObW5M3CAGT6OdubyH6FztKfJCcFB	
Unit 4	https://www.youtube.com/playlist?list=PL3-wYx4t4yCjpcfUDz-TgD_ainZ2K3MUZ	
Unit 5	https://www.youtube.com/playlist?list=PLyqSpQzTE6M9SYI5RqwFYtFYab94gJpWk	

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0103N	L	T	P	Credit
Course Title	Professional Communication and Management Principles	2	0	0	2
Course objective: The objective of the course is to ensure that the students can understand the basic features of professional communication, communicate effectively in a professional environment, equipped to appear for the International Business English Certification, explain functions of management in terms of planning and organizing					
Pre-requisites: The student should be able to communicate in basic English.					
Course Contents / Syllabus					
UNIT-I	Introduction to Professional Communication				5 hours
Communication – definition, process, levels, flow, types, and barriers, Technical Communication and its importance.					
UNIT-II	Reading and Listening Skills				5 hours
Reading basics: Skimming, scanning, churning, assimilation, Reading texts for note making, paraphrasing, diagrams, charts, picture reading, Process and types of listening , Overcoming barriers to effective listening					
UNIT-III	Written Communication				10 hours
Vocabulary building - word formation; etymology; root words, prefixes & suffixes; synonyms; antonyms; homophones; abbreviations; one-word substitutes ,Requisites of a good sentence ,Common errors - subject-verb agreement and concord, tenses, articles, preposition; punctuation , Paragraph writing ,Basics of letter & email writing ,Resume & Job application letter					
UNIT-IV	Effective speaking Skills				10 hours
Components of effective speaking, Applied phonetics – phoneme, syllable, word accent, stress, rhythm & intonation , Public Speaking – Kinesics, Chronemics, Proxemics , Voice dynamics ,Presentation Skills Facing an Interview , Do’s & Don’ts of a GD					
UNIT-V	Management & Management Practices				10 hours
Meaning, Definition and Scope of Management, The process of Management, Development of Management thought, Contribution of F.W. Taylor and Henry Fayol, Hawthorne Studies, Qualities of an Efficient Management, TQM , Importance of Planning, Steps in Planning, Organizational Structures, Meaning and Methods of Recruitment and Selection Process, Motivation—Meaning and Theories of Motivation, Leadership styles. Controlling Process.					
Course outcome: At the end of course, the student will be able to					
CO 1	Understand the fundamentals of communication				K1
CO 2	Understand and apply reading and listening tasks for better professional competence.				K1, K4
CO 3	Write professionally in simple and correct English.				K2
CO 4	Apply speaking skills in various professional situations.				K4
CO 5	Understand and apply the concepts of planning and organizing.				K2,K4
Text books :					
(1) Technical Communication – Principles and Practices by Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.					

(2) Cambridge English Business Benchmark (Pre-intermediate to Intermediate), 2nd edition, Norman Whitby, Cambridge University Press, 2006, UK.	
(3) Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi	
(4) Koontz Harold & Wehrich Heinz – Essentials of Management (Tata McGraw Hill, 5th Edition, 2008)	
Link: NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=TtbImDfUt4c&list=PLLy_2iUCG87DH0iQSVWZ8iamV15SaLIXQ&index=2
Unit 2	https://www.youtube.com/watch?v=yWF4tT6o2mM&list=PLLy_2iUCG87DH0iQSVWZ8iamV15SaLIXQ&index=6
Unit 3	https://www.youtube.com/watch?v=KWym6QfFhw&list=PLLy_2iUCG87DH0iQSVWZ8iamV15SaLIXQ&index=10
Unit 4	https://www.youtube.com/watch?v=ybVX_lu1u8E&list=PLLy_2iUCG87DH0iQSVWZ8iamV15SaLIXQ&index=15
Unit 5	https://www.youtube.com/watch?v=Ug0ORs3R4WQ&list=PLLy_2iUCG87DH0iQSVWZ8iamV15SaLIXQ&index=19

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0104Z	L	T	P	Credit
Course Title	Computer System Organization	3	0	0	3
Course objective: The basic concepts and components of digital logic design, The different methods of data representation in computers, The different micro operations and data transfer methods, Design, functionality and taxonomy of CPU, Memory types and functionality with data transfer methods.					
Pre-requisites: Students are familiar with the computer system and its basic operations.					
Course Contents / Syllabus					
UNIT-I	Introduction	8 hours			
Introduction: Digital Computers and Number System, Logic Gates, Boolean Algebra, Map Simplification upto five variables, Combinational Circuits, Sequential Circuits, Look ahead carry adders, Data types, Complements, Fixed point representation, Fixed Point Addition & Subtraction, floating point Representation, Booth's Multiplication, IEEE754 Floating point standards.					
UNIT-II	Register Transfer & Micro operations	8 hours			
Register Transfer Language, Register Transfer, Bus and Memory Transfers, Common Bus System, Two Bus Organization, Three Bus Organization, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic & Logic unit design.					
UNIT-III	Central Processing Unit	8 hours			
Micro programmed Control Unit, Hardwired Control Unit, General register Organization, Stack Organization, Instruction types, formats, instruction cycles and sub cycles (Fetch, decode, execute etc.), execution of a complete instruction, Addressing Modes, Reduced Instruction set computer, Complex Instruction set Computer					
UNIT-IV	Memory Management	8 hours			
Memory Hierarchy, Main Memory (RAM and ROM chips), Auxiliary Memory, and Associative memory, Cache Memory, Memory Mapping: Associative mapping, Direct mapping, Set associative mapping. 2D and 2.5D memory organization					
UNIT-V	Input/output	8 hours			
I/O interface, I/O ports, Interrupts, Modes of data Transfer: Programmed I/O, Interrupt Initiated I/O, and Direct memory access (DMA), I/O channels and processors, Serial Communication, Standard communication interfaces. Case Study : Multi core processing, Multithreading architecture					
Course outcome: At the end of course, the student will be able to					
CO 1	To explain the number systems including computer arithmetic, logic gates, Boolean algebra, Minimization techniques etc.				K ₁ , K ₂
CO 2	To discuss about the different binary codes and arithmetic operations.				K ₁ , K ₄
CO 3	To elaborate about the register transfer operations and construction of buses by using different digital components.				K ₃

CO 4	To analyze the functional units of the processor such as register file, arithmetic-logical unit and control unit.	K ₂
CO 5	To demonstrate cache subsystem, memory mapping techniques and Input-Output subsystem and protocols for data communication.	K ₂ , K ₄

Text books :

(1) Computer System Architecture, M.Mano (PHI).

(2) Computer Organization, Vravice, Zaky&Hamacher (TMH Publication).

(3) Logic and Digital Design, Morris Mano and Kimi Charles 4th Edition, Prentice Hall.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=leWKvuZVUE8&list=PL1A5A6AE8AFC187B7
Unit 2	https://www.youtube.com/watch?v=4TzMyXmzL8M&list=PL59E5B57A04EAE09C
Unit 3	https://www.youtube.com/watch?v=msqxkEKfg8I&list=PLgHucKw979AvcnTpPNZMZyORdL5HvTr9m
Unit 4	https://www.youtube.com/watch?v=leWKvuZVUE8&list=PL08A7B4AC6FD34016
Unit 5	https://www.youtube.com/watch?v=IZ5dicfkIP4&list=PLEAYkSg4uSQ0eDa24iKd7qJlsvr8XcvF

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0105	L	T	P	Credit
Course Title	Discrete Mathematics	3	0	0	3
<p>Course objective: To develop mathematical ability in understanding mathematical reasoning, ability to perform combinatorial analysis and knowledge about discrete structures, Perform operations on discrete mathematics such as sets, functions and relations, Verify the correctness of an argument using symbolic logic and truth tables, Solve problems using counting techniques and combinatorics , to improve formal reasoning skills acquisition and mathematical knowledge</p>					
<p>Pre-requisites:Students must be aware of basic set operations.</p>					
Course Contents / Syllabus					
UNIT-I	Set Theory, Relations & Functions	8 hours			
<p>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.</p> <p>Relations & Functions: Definition, Operations on relations, Composite relations, Properties of relations, Equality of relations, Partial order relation and Recursive definition of relation.</p> <p>Functions - Definition, Classification of functions, Operations on functions, Recursively defined functions and Growth of Functions.</p> <p>Natural Numbers: Introduction, Piano’s axioms, Mathematical Induction, Strong Induction and Induction with Nonzero Base cases.</p>					
UNIT-II	Posets, Hasse Diagram, Lattices and Graph	8 hours			
<p>Posets, 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.</p> <p>Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring</p> <p>Trees:Definition, Binary tree, Binary tree traversal (BFS and DFS), Binary search tree.</p>					
UNIT-III	Algebraic Structures, Rings and Fields	8 hours			
<p>Algebraic Structures: Introduction to algebraic Structures and properties. Types of algebraic structures: Semi group, Monoid, Group, Abelian group and Properties of group. Subgroup, Cyclic group, Cosets, Permutation and Symmetric groups, Homomorphism and Isomorphism of groups.</p> <p>Rings and Fields: Definition and elementary properties of Rings and Fields.</p>					
UNIT-IV	Propositional & Predicate Logic	8 hours			
<p>Propositional & Predicate Logic: Propositions well formed formula, Truth tables, Tautology, Contradiction, Algebra of propositions, Theory of Inference and Natural Deduction.</p> <p>Predicate Logic: Theory of predicates, First order predicate, Predicate formulas, quantifiers, Inference theory of predicate logic.</p>					
UNIT-V	Recurrence Relations &Combinatorics	8 hours			
<p>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</p> <p>Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle, Pólya’s Counting Theory.</p>					
<p>Course outcome: At the end of course, the student will be able to</p>					

CO 1	Use mathematical and logical notation to define and formally reason about basic discrete structures such as Sets, Relations, Functions and Induction.	K1, K2
CO 2	Apply mathematical arguments using logical connectives and quantifiers to check the validity of an argument through truth tables and propositional and predicate logic.	K1, K4
CO 3	Identify and prove properties of Algebraic Structures like Groups, Rings and Fields	K3
CO 4	Apply the concept of combinatorics to solve basic problems in discrete mathematics	K2
CO 5	Formulate and solve recurrences and recursive functions	K2, K4

Text books :

(1) Discrete Mathematics and Its Applications, Kenneth H. Rosen, McGraw-Hill, 2006.

(2) Discrete Mathematical Structures, B. Kolman, R. C. Busby, and S. C. Ross, Prentice Hall, 2004

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=xIUfKMKSB3Y&list=PL0862D1A947252D20&index=1
Unit 2	https://www.youtube.com/watch?v=DmClf8ypks&list=PL0862D1A947252D20&index=3
Unit 3	https://www.youtube.com/watch?v=kZ6UqFm8lnw&list=PL0862D1A947252D20&index=5
Unit 4	https://www.youtube.com/watch?v=rwZxR2YRpE&list=PL0862D1A947252D20&index=6
Unit 5	https://www.youtube.com/watch?v=9AUCdsmBGmA&list=PL0862D1A947252D20&index=10

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0151	L	T	P	Credit
Course Title	C Programming Lab	0	0	4	2
Course objective: At the end of course, the students will be able to do the following:					
1	To introduce students to the basic knowledge of programming fundamentals of C language.				
2	To impart writing skill of C programming to the students and solving problems.				
3	To impart the concepts like looping, array, functions, pointers, file, structure.				
Pre-requisites: Students are expected to be able to open command prompt window or Terminal window, edit a text file, download and install software, and understand basic programming concepts.					
Course Contents / Syllabus					
Introduction Programs					
<ol style="list-style-type: none"> 1. Program to explain the basic I/O Statement 2. Program to Explain the use and implementation of Data Types 					
Operators					
<ol style="list-style-type: none"> 1. Program to understand the use of Logical Operators 2. Program to implement Arithmetic and other Operators 					
Conditional Statement					
<ol style="list-style-type: none"> 1. Program to implement If..else statement 2. Program to implement nested if ... else statement 					
Switch Statement					
<ol style="list-style-type: none"> 1. Implementation and use of Switch Statement 					
Basic Loop operations					
<ol style="list-style-type: none"> 1. Program to implement loops (for,while,do..while) 2. Programs to print characters(screen printing) 					
Arrays					
<ol style="list-style-type: none"> 1. Program for manipulation of Single Dimension Array 2. Program for illustration use and application of Multi-dimensional Array like addition, multiplication of Matrix 3. Program to implement Searching and Sorting. 					
Exercise 7: Functions					
<ol style="list-style-type: none"> 1. Program to illustrate the use of Functions 					

2. Program to implement Call by Value
3. Program to implement Call by function

Structure & Union

1. Program to show use of structure
2. Programs to show use of Union

Dynamic Memory Allocation

1. Program to make use of DMA function

File operations using command line arguments

1. Program to write and read from file
2. Program to illustrate use of File Operations
3. Program to implement Command line Arguments

Course outcome: At the end of course, the student will be able

CO 1	Write the algorithm and draw a flow chart of a given problem.
CO 2	Recognize and understand the syntax and construction of C programming code.
CO 3	Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

Text books

- (1) Problem Solving and Program Design in C, 4th edition, by jeri R. Hanly and Elli B.Koffman.
- (2) Programming in C by PradipDey, Manas Ghosh 2nd edition Oxford University Press.
- (3) E.Balaguruswamy, Programming in ANSI C 5th Edition McGraw-Hill

Reference Books

- (1) Brain W.Kernighan& Dennis Ritchie, C Programming Language, 2nd edition, PHI

MCA - FIRST YEAR FIRST SEMESTER			
Course Code	AMCA0152	LTP	Credit
Course Title	Operating System Lab	00 4	2
Course Objective:			
Students will gain practical experience with designing and implementing concepts of operating systems such as CPU scheduling, memory management and deadlock handling using C language.			
Suggested list of Experiment			
Sr. No.	Name of Experiment		
Introduction to Linux/Android/Windows Operating System: Directory commands, File Commands, Admin Commands, Introduction to Editor, Introduction to shell scripts.			
CPU scheduling			
1	Program to simulate different scheduling algorithms to find average turnaround time and waiting time		
Memory Allocation			
2	Program to simulate the contiguous memory allocation techniques like a) Worst-fit b) Best-fit c) First-fit		
Page Replacement			
3	Program to simulate the Page Replacement Algorithms		
Deadlock			
4	Program to simulate algorithm for the purpose of deadlock avoidance		
Lab Course Outcome: Upon the completion of Operating Systems practical course, the student will be able to:			
CO 1	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.		
CO 2	Implement page replacement schemes.		
CO 3	Understand the concepts of deadlock in operating systems		

MCA - FIRST YEAR FIRST SEMESTER

Course Code	AMCA0153N	L T P	Credit
Course Title	Professional Communication Lab	0 0 4	2

Course Objective:

Students can converse effectively in English , can face a job interview

Suggested list of Activities

	Activities	Time
1. Interactions Level 1:	<ul style="list-style-type: none"> • Greet and take leave of people • Introducing oneself and others • Conversations in different situations - * role play • Telephone conversations 	4 hours
2. The Sounds of English – Pronunciation practice through Oral Drill	<ul style="list-style-type: none"> • Relationship between letters and sounds • Practice difficult consonant sounds • Practice difficult vowels and diphthongs • Learn and practice consonant clusters 	6hours
3. Interactions Level 2: (Introducing the vocabulary & sentence structures of polite conversation)	<ul style="list-style-type: none"> • Getting someone’s attention • Seeking clarifications politely • Expressing opinions, apologizing • Listening effectively 	4hours
4. Stress and Tone - Pronunciation practice through Oral Drill	<ul style="list-style-type: none"> • Syllables and word stress • Sentence stress • Strong and weak forms of words 	6 hours
5. Interactions level 3:	Handling basic interview questions	8 hours
6. *One-to-one Interview	<ul style="list-style-type: none"> • Emphasis on body language and voice dynamics 	20 hours

[Note: *To be video recorded and graded]

	Course outcome: At the end of the course the students will be able to	Levels
CO 1	Understand the basic nuances of interpersonal and organizational communication	K2
CO 2	Enunciate individual speech sounds clearly	K3
CO 3	Express themselves effectively using appropriate vocabulary	K3
CO 4	Apply the knowledge of basic phonetics to speak more effectively and fluently	K3
CO 5	Learn interview skills with effective body language	K3

MCA - FIRST YEAR FIRST SEMESTER					
Course Code	AMCA0154	L	T	P	Credit
Course Title	Computer Organization Lab	0	0	4	2
Course objective: At the end of course, the students will be able to do the following:					
1	Students will gain practical experience with designing and implementing concepts of gates , Multiplexer, Implement a simple instruction set computer				
Pre-requisites: Students are expected to be able understand the basic concepts of computer.					
Course Contents / Syllabus					
<ol style="list-style-type: none"> 1. Verification of the functionality of all logic gates. 2. Implementing HALF ADDER, FULL ADDER using basic logic gates. 3. Implementing Binary -to -Gray, Gray -to -Binary code conversions. 4. Implementing 3-8 line DECODER. 5. Implementing 4x1 and 8x1 MULTIPLEXERS. 6. Verify the excitation tables of various FLIP-FLOPS. <p>Perform the following experiments using Simulation:</p> <ol style="list-style-type: none"> 7. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers. 8. Design of an 8-bit ARITHMETIC LOGIC UNIT using simulator. 9. Design the data path of a computer from its register transfer language description. 10. Implement a simple instruction set computer with a control unit and a data path 					
<i>Note: Experiment may vary or be changed as per the requirement.</i>					
Course outcome: At the end of course , the student will be able to					
CO 1	Design and verify combinational circuits (adder, code converter, decoder, multiplexer) using basic gates.		K1,K2		
CO 2	Design and verify various flip-flops.		K2,K3		
CO 3	Demonstrate combinational circuit using simulator K1,K3				
Text books					
1. Computer System Architecture, M.Mano (PHI)					
3. Logic and Digital Design, Morris Mano and Kimi Charles 4th Edition, Prentice Hall.					
Reference Books					
1. Structured Computer Organization, Tannenbaum (PHI)					
2. Computer Organization, Stallings (PHI)					

MCA - FIRST YEAR SECOND SEMESTER					
Course Code	AMCA0201N	L	T	P	Credit
Course Title	Object Oriented Programming with JAVA	3	1	0	4
<p>Course objective:The basic and advance concepts of OOPs programming, Student will be able to implement Core Java programming , will be able to implement Packages, Exception Handling and String Handling and its implementation , able to understand Concurrency in Java and I/O Stream and its implementation , able to understand GUI Programming, Generics, Collections and JDBC and their use.</p>					
<p>Pre-requisites:Students must know at least the basics of how to use a computer, and should be able to start a command line shell. Knowledge of basic programming concepts, as covered in ‘Programming Basic’ course is necessary</p>					
Course Contents / Syllabus					
UNIT-I	Introduction				8 hours
<p>Object Oriented Programming: Introduction and Features: Abstraction, Encapsulation, Polymorphism, and Inheritance concepts, Need of OOP’s paradigm. Modeling Concepts: Introduction, Class Diagram and Object Diagram. Control Statements: Decision Making, Looping and Branching, Argument Passing Mechanism: Command Line Argument.</p>					
UNIT-II	Basics of Java Programming				8 hours
<p>Class and Object: Object Reference, Constructor, Abstract Class,Interface and its uses, Defining Methods, Use of “this”, “super”, static and final keyword, Access control, modifiers, Nested class, Inner class, Anonymous inner class. Garbage Collection and finalize () Method. Inheritance: Introduction and Types of Inheritance in Java, Constructors in Inheritance. Polymorphism: Introduction and Types, Overloading and Overriding. Lambda expression: Introduction and Working with Lambda Variables Arrays: Introduction, single and multidimensional arrays</p>					
UNIT-III	Packages, Exception Handling and String Handling				8 hours
<p>Packages: Introduction and Types, Access Protection in Packages, Import and Execution of Packages. Exception Handling, Assertions and Localizations: Introduction and Types, Exceptions vs. Errors, Handling of Exception. Finally, Throws and Throw keyword, Multiple Catch Block, Nested Try and Finally Block. Assertions and Localizations Concepts and it’s working, Tokenizer. String Handling: Introduction and Types, Operations, Immutable String, Method of String class, String Buffer and String Builder class, Reading/Writing from console and files, Simple I/O using System. Out and the Scanner class.</p>					
UNIT-IV	Concurrency in Java and I/O Stream				8 hours
<p>Threads: Introduction and Types, Creating Threads, Thread Life-Cycle, Thread Priorities, Daemon Thread, Runnable Class, Synchronizing Threads. I/O Stream: Introduction and Types, Common I/O Stream Operations, Interaction with Console I/O and File I/O. Annotations: Introduction, Custom Annotations and Applying Annotations with its types.</p>					
UNIT-V	GUI Programming, Generics ,Collections and JDBC				8 hours
<p>GUI Programming: Introduction and Types of Swings, Abstract Window Toolkit, Components and Containers, Layout Managers and User-Defined Layout and Event Handling. Generics and Collections: Introduction, Using Method References, Using Wrapper Class, Using Lists, Sets, Maps and Queues, Working with Generics. Database Connectivity using JDBC: Introduction, JDBC Drivers, Select, Insert, Delete and Update Statements and Prepared Statement Interface</p>					
<p>Course outcome: At the end of course, the student will be able to</p>					

CO 1	Identify the concepts of object oriented programming and relationships among them needed in modeling.	K2
CO 2	Demonstrate the Java programs using OOP principles with various types of classes and also implement the concepts of lambda expressions	K3
CO 3	Implement packages with different protection level resolving namespace collision and evaluate the error handling concepts for uninterrupted execution of Java program.	K3,K5
CO 4	Implement Concurrency control, I/O Streams and Annotations concepts and its types by using Java program.	K3
CO 5	Design and develop the GUI based application, Generics, Collections and JDBC applications in Java programming language to solve the real world problem.	K6

Text books :

(1) Herbert Schildt, "Java - The Complete Reference", McGraw Hill Education 12th edition

(2) Herbert Schildt, "Java: A Beginner's Guide", McGraw-Hill Education 2nd edition

(3) James Rumbaugh et. al, "Object Oriented Modeling and Design", PHI 2nd Edition

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=r59xYe3Vyks&list=PLS1QulWo1RIbfTjQvTdj8Y6yyq4R7g-AI
Unit 2	https://www.youtube.com/watch?v=ZHLdVRXluC8&list=PLS1QulWo1RIbfTjQvTdj8Y6yyq4R7g-AI&index=18
Unit 3	https://www.youtube.com/watch?v=hBh_CC5y8-s
Unit 4	https://www.youtube.com/watch?v=qQVqfvs3p48
Unit 5	https://www.youtube.com/watch?v=2qWPpgALJyw

MCA - FIRST YEAR SECOND SEMESTER					
Course Code	AMCA0202	L	T	P	Credit
Course Title	Database Management System	3	0	0	3
Course objective: Features of a database system and its application and compare various types of data models , Construction an ER Model for a given problem and transform it into a relation database schema , Formulate solution to a query problem using SQL Commands, relational algebra, tuple calculus and domain calculus , need of normalization and normalize a given relation to the desired normal form , Different approaches of transaction processing and concurrency control					
Pre-requisites: Students are expected to be familiar with Data structure					
Course Contents / Syllabus					
UNIT-I	Introduction				8 hours
Introduction: Overview, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure. Data Modeling Using the Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Candidate Key, Primary Key, Specialization, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.					
UNIT-II	Relational data Model and Language				8 hours
Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. Introduction to SQL: Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and their Procedure. Tables, Views and Indexes. Queries and Sub Queries Nested sub queries. Aggregate Functions. Group by, having clause ,Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL					
UNIT-III	Data Base Design & Normalization				8 hours
Functional dependencies, Armstrong's inference rules, canonical cover ,Equivalence of Sets of Functional Dependencies normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design					
UNIT-IV	Transaction Processing Concept				8 hours
Transaction System, Transition Diagram, ACID Properties, Schedule, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Directory System, Failures and their classification, recovery and atomicity					
UNIT-V	Concurrency Control Techniques				8 hours
Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Concurrency Control in distributed database. Advance Concepts: Case Study , Introduction to NOSQL					
Course outcome: At the end of course, the student will be able to					
CO 1	Describe the features of a database system and its application and compare various types of data models.				K2
CO 2	Construct an ER Model for a given problem and transform it into a relation database schema.				K5, K6
CO 3	Formulate solution to a query problem using SQL Commands, relational algebra, tuple calculus and domain calculus.				K5, K6

CO 4	Explain the need of normalization and normalize a given relation to the desired normal form.	K2, K3
CO 5	Explain different approaches of transaction processing and concurrency control, NOSQL	K2

Text books :

(1) Silberschatz, H. Korth and Sudarshan S., “Database System Concepts”, 6th Edition, McGraw-Hill International, 2010

(2) Elmasri R. and ShamakantB.Navathe, “Fundamentals of Database Systems”, 6th Edition, Addison Wesley, 2011

(3) Date C J, “An Introduction To Database System”, Addison Wesley

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/channel/UCpgnQKuPmFsZyksHc1IMceg
Unit 2	https://www.youtube.com/watch?v=DRSog3SA4-Y&list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMif4Ebh&index=5
Unit 3	https://www.youtube.com/channel/UCpgnQKuPmFsZyksHc1IMceg
Unit 4	https://www.youtube.com/watch?v=B9tS_JNbW00&list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMif4Ebh&index=10
Unit 5	https://www.youtube.com/watch?v=K5jqNjnE-pE&list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMif4Ebh&index=16

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0203N	L	T	P	Credit
Course Title	Data Structures & Analysis of Algorithms	3	1	0	4
Course objective: Analyze the asymptotic performance of algorithms, write rigorous correctness proofs for algorithms, demonstrate a familiarity with major algorithms and data structures, apply important algorithmic design paradigms and methods of analysis.					
Pre-requisites: Basic knowledge of programming and mathematics					
Course Contents / Syllabus					
UNIT-I	Introduction To Data Structure				8 hours
<p>Introduction to data structure: Data, Entity, Information, Difference between Data and Information, Data type , Build in data type, Abstract data type, Definition of data structures, Types of Data Structures: Linear and Non-Linear Data Structure, Introduction to Algorithms: Definition of Algorithms, Difference between algorithm and programs, properties of algorithm, Algorithm Design Techniques, Performance Analysis of Algorithms, Complexity of various code structures, Order of Growth, Asymptotic Notations.</p> <p>Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Derivation of Index Formulae for 1-D,2-D Array Application of arrays, Sparse Matrices and their representations.</p> <p>Linked lists: Array Implementation and Pointer Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition Subtraction & Multiplications of Single variable.</p>					
UNIT-II	Stacks & Queue				8 hours
<p>Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers.</p> <p>Queues: Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and PriorityQueue.</p> <p>Searching: Concept of Searching, Sequential search, Index Sequential Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing.</p>					
UNIT-III	Sorting & Graph				8 hours
<p>Sorting: Insertion Sort, Selection Sort, Bubble Sort, Heap Sort, Comparison of Sorting Algorithms, Sorting in Linear Time: Counting Sort and Bucket Sort.</p> <p>Graphs: Terminology used with Graph, Data Structure for Graph Representations: Adjacency Matrices, Adjacency List, Adjacency. Graph Traversal: Depth First Search and Breadth First Search, Connected Component.</p>					
UNIT-IV	Tree				8 hours
<p>Trees: Basic terminology used with Tree, Binary Trees, Binary Tree Representation: Array Representation and Pointer (Linked List) Representation, Binary Search Tree, Complete Binary Tree, An Extended Binary Trees, Tree Traversal algorithms: Inorder, Preorder and Post order, Constructing Binary Tree from given Tree Traversal, Operation of Insertion, Deletion, Searching & Modification of data in Binary Search Tree, Threaded Binary trees, Huffman coding using Binary Tree, AVL Tree and B Tree.</p>					
UNIT-V	Dynamic Programming				8 hours
<p>Divide and Conquer with Examples Such as Merge Sort, Quick Sort, Matrix Multiplication: Strassen's Algorithm</p> <p>Dynamic Programming:Dijkstra Algorithm, Bellman Ford Algorithm, All- pair Shortest Path: Warshal Algorithm, Longest Common Sub-sequence, Greedy Programming: Prims and Kruskal algorithm</p>					

Course outcome: At the end of course, the student will be able to

CO 1	Explain the concept of data structure, abstract data types, algorithms, analysis of algorithms and basic data organization schemes such as arrays and linked lists.	K ₂
CO 2	Describe the applications of stacks and queues and implement various operations on them using arrays and linked lists.	K ₃
CO 3	Describe the properties of graphs and trees and implement various operations such as searching and traversal on them.	K ₃
CO 4	Compare incremental and divide-and-conquer approaches of designing algorithms for problems such as sorting and searching.	K ₄
CO 5	Apply and analyze various design approaches such as Divide-and-Conquer, greedy and dynamic for problem solving.	K ₄

Text books :

(1) Cormen T. H., Leiserson C. E., Rivest R. L., and Stein C., “Introduction to Algorithms”, PHI, Third Edition August 2009.

(2) Horowitz Ellis, Sahni Sartaj and Rajasekharan S., “Fundamentals of Computer Algorithms”, 2nd Edition, Universities Press, Third Edition 2010.

(3) Dave P.H., H.B. Dave, “Design and Analysis of Algorithms”, 2ND Edition 2012, Pearson Education.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=oZgbwa8lvDE&list=PLxR_6l4pE6quoVjSj_ShLfIftUpd_e5yo&index=1
Unit 2	https://www.youtube.com/watch?v=-Lw8isQCi4g&list=PLxR_6l4pE6quoVjSj_ShLfIftUpd_e5yo&index=4
Unit 3	https://www.youtube.com/watch?v=_VV9v41FIq0&list=PLxR_6l4pE6quoVjSj_ShLfIftUpd_e5yo&index=7
Unit 4	https://www.youtube.com/watch?v=HSokTdyd5BE&list=PLxR_6l4pE6quoVjSj_ShLfIftUpd_e5yo&index=10
Unit 5	https://www.youtube.com/playlist?list=PLxR_6l4pE6quoVjSj_ShLfIftUpd_e5yo

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0205	L	T	P	Credit
Course Title	Design Thinking	3	0	0	3
Course objective: To introduce students with the design process as a tool for breakthrough innovation , help students develop into professionals with good interpersonal and presentation skills , help students becoming efficient team players with potent leadership skills , participate and lead teams in order to collaborate and create innovative ideas and solutions , apply design thinking skills for understanding the assumptions and claims that frame the idea.					
Pre-requisites: None					
Course Contents / Syllabus					
UNIT-I	Introduction				8 hours
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, creativity to innovation, design mindset. Introduction to elements and principles of design. Arcturus IV case study, individual activity on identifying an opportunity in different scenarios.					
UNIT-II	Ethical Values and Empathy				8 hours
Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, the gap between desires and actualization. Understanding culture in family, society, institution, startup, 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. Understand stakeholders, techniques to empathize, identify key user problems. Empathy tools- Interviews, empathy maps, emotional mapping, immersion and observations, customer journey maps, and brainstorming. Individual activity- ‘Moccasin walk’, scenario-based role-play activities using empathy mapping.					
UNIT-III	Problem Statement and Ideation				8 hours
Defining the problem statement, synthesis frameworks, 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, value, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, analyze – four W’s, 5 why’s, “How Might We”, Conflict of Interest and Six Thinking Hats. Case study /Group activities - making right personas and defining the key problem, ideation activity games - six thinking hats, million-dollar idea					
UNIT-IV	Critical Thinking				8 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 in congruences, five pillars of critical thinking, argumentation versus rhetoric, cognitive bias, tribalism, and politics. Case study on applying critical thinking on different scenarios.					
UNIT-V	Logic and Argumentation				8 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					
Course outcome: After completion of this course, students will be able to					
CO 1	Develop a strong understanding of the design process and how it can be applied in a variety of business settings				K1
CO 2	Understand and analyze self, culture and exhibit ethical behavior				K1,K2

CO 3	Use empathy tools for target segment from different cultures by understanding their unique needs	K2
CO 4	Generate innovative ideas and define specific problem statement to lead nurturing	K1,K2
CO 5	Demonstrate an enhanced ability to apply design thinking skills for evaluation of claims and arguments	K2,K3

Text books :

(1) 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization by Vijay Kumar

(2) This is Service Design Thinking: Basics, Tools, Cases by Marc Stickdorn and Jakob Schneider

(3) Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation by Tim Brown

(4) R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

(5) BP Banerjee, 2005, Foundations of Ethics and Management, Excel Books.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=dt9IQCeGkfQ&list=PLnLoSz9w9WhreRPe5jBsKBJETOr22cGs0&index=2
Unit 2	https://www.youtube.com/watch?v=AXAC-d7ihtY&list=PLnLoSz9w9WhreRPe5jBsKBJETOr22cGs0&index=4
Unit 3	https://www.youtube.com/watch?v=rMK8NMTDqfA&list=PLnLoSz9w9WhreRPe5jBsKBJETOr22cGs0&index=7
Unit 4	https://www.youtube.com/watch?v=EECXvh6UC9I&list=PLnLoSz9w9WhreRPe5jBsKBJETOr22cGs0&index=12
Unit 5	https://www.youtube.com/playlist?list=PLnLoSz9w9WhreRPe5jBsKBJETOr22cGs0

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0214Z	L	T	P	Credit
Course Title	Fundamentals of Digital Marketing and Analytics	2	0	0	2
Course objective: To help students understand digital marketing practices, inclination of digital consumers and role of content marketing , provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world , impart learning on various digital channels and how to acquire and engage consumers online , provide insights on building organizational competency by way of digital marketing practices and cost considerations , develop understanding of the latest digital practices for marketing and promotion.					
Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.					
Course Contents / Syllabus					
UNIT-I	Foundation Data Everywhere				8 hours
Introducing data analytics and thinking - use data analytics and the tools of their trade to inform those decisions. All about analytical thinking- these roles and the key skills used by analysts. The wonderful world of data- how the data life cycle and data analysts' work both relate to your progress through this program.					
UNIT-II	Make Data Driven Decision				9 hours
Make Data Driven Decision Set up your toolbox: - spreadsheets, query languages, and data visualization tools. Endless career possibilities - data analysts, data analyst certificate. Effective questions- common analysis challenges and how analysts address them, guide your analysis					
UNIT-III	Data-driven decisions and spreadsheets				8 hours
Data-driven decisions and spreadsheets - data of all kinds and its impact on real-life choices and strategies, reports and dashboards. Spreadsheet basics- data analysts use, spreadsheets work, structured thinking, analysts understand problems, problems solutions.					
UNIT-IV	Prepare Data for Exploration and Stakeholder				8 hours
Prepare Data for Exploration and Stakeholder - data analysts, balance needs and expectations, managing stakeholder expectations, communication with your team. Data types 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-V	Organizing and protecting your data				8 hours
Organizing and protecting your data 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					
Course outcome: At the end of course, the student will be able					
CO 1	It will develop proficiency in interpreting marketing strategies in the digital age and provide fundamental knowledge for working in an online team.				K1, K2
CO 2	It will enable them to develop various online marketing strategies for various marketing-mix measures.				K1, K4
CO 3	It will guide them to use various digital marketing channels for consumer acquisition and engagement.				K3
CO 4	It will help in evaluating the productivity of digital marketing channels for business success.				K2
CO 5	It will prepare candidates for global exposure of digital marketing practices to make them employable in a high growth industry				K2, K4
Text books :					
(1) Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015)					
(2) Eric Greenberg, and Kates, Alexander; Strategic Digital Marketing: Top Digital Experts Share the					

Formula for Tangible Returns on Your Marketing Investment; McGraw-Hill Professional (October, 2013).	
(3) David Whiteley; E-Commerce: Strategy, Technologies and Applications, McGraw Hill Education	
Link: NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=68B3N0x3cPI&list=PLbRMhDVUMnge625uLkVoqfS-uK-KJTBgp&index=1
Unit 2	https://www.youtube.com/watch?v=3iSKFCKLUsI&list=PLbRMhDVUMnge625uLkVoqfS-uK-KJTBgp&index=2
Unit 3	https://www.youtube.com/watch?v=67IO4HtJitg&list=PLbRMhDVUMnge625uLkVoqfS-uK-KJTBgp&index=8
Unit 4	https://www.youtube.com/watch?v=fYSvrZD4G38&list=PLbRMhDVUMnge625uLkVoqfS-uK-KJTBgp&index=14
Unit 5	https://www.youtube.com/watch?v=GauClv1HsZA&list=PLbRMhDVUMnge625uLkVoqfS-uK-KJTBgp&index=19

MCA - FIRST YEAR SECOND SEMESTER					
Course Code	AMCA0215Z	L	T	P	Credit
Course Title	Fundamentals of Digital Marketing and Optimization	2	0	0	2
Course objective: To introduce students to Understand how digital and social media have disrupted the way businesses sell to consumers , help students to Recognize how marketers use the customer journey model to influence purchase decisions on digital platforms using digital content and tools , identify the benefits and advantages to a business of using social media to engage an audience , Build, manage, and sustain an active social media community.					
Pre-requisites: Basic Marketing Concepts, Basic Knowledge of Computers					
Course Contents / Syllabus					
UNIT-I	Social Media and Digital Marketing Fundamental				8 hours
Digital Marketing Landscape: Digital Consumer Behavior, The Digital Customer Journey, The Digital Opportunity, Digital and Your Organization, Business Growth and Digital. Digital Marketing Principles: Key Digital Marketing Concepts, Traditional and Digital Marketing, 3i Principles, Integrating Traditional and Digital Marketing, Tools for Digital Marketing.					
UNIT-II	Social Media and Social Content Strategy				8 hours
Content Marketing for Social: Content Marketing, Content Types, Social Media Platforms, Content Creation Tools, Influencer Marketing, eBook and Whitepapers Social Media and Business Strategy: Social Media Platforms, Key Concepts of Social Media, Types and Primary Uses of Social Media Platforms, Benefits of Social Media to Business, Role of Social Media ,Social Media Platforms for Business: Social Media Marketing Concepts, Key Social Media Platforms, Setting up Social on Key Platforms, The Value of Building a Social Media Community					
UNIT-III	Social Content Strategy and Promotion				8 hours
Social Content Strategy: Content Seeding, Social Media Formats, Content Promotion, Content Optimization, Influencer Marketing, Word of Mouth Marketing, Measurement and Tracking, Content Promotion Strategy, Audience Segmentation Facebook Marketing Fundamentals: Introduction to Facebook, The Value to Marketers, Page Management, Facebook Live, Messenger Facebook Ads and Marketing: Facebook Ads, Ads Manager, Strategy Process, Buying Channels and Ad Auctions					
UNIT-IV	Instagram and Snapchat Marketing				8 hours
Instagram and Snapchat - Social Apps: Introduction to Social Apps, Differentiating Social Apps, Basic Features, Instagram: Video, stories, live, Instagram Posts, Snapchat Meanings, Snapchat Story, Basic Features Instagram and Snapchat Marketing: Instagram Account Overview, Audience Development, Advertising Overview, 3V Advertising, Ads Manager, SnapAds, Instagram Analysis, Snapchat Analysis, Campaign Setup, Snapchat Geofilters					
UNIT-V	Twitter LinkedIn and YouTube Marketing				8 hours
Twitter Marketing: Twitter Concepts, Platform Features, Profile Promotion and management, Hashtags, Analysis and Reporting. LinkedIn and Social Selling: Social Selling and Personal Branding, The Benefits of Personal Branding, LinkedIn Concepts, Features and Functions, LinkedIn Social Plugins, LinkedIn Analytics. YouTube and Social Video Marketing: Misconceptions and Benefits, Platform Features, Channel Setup, Channel Promotion, Channel Management, YouTube Native Formats.					
Course outcome: After completion of this course, students will be able to					
CO 1	Understand important concepts of digital and social media.				K1

CO 2	Understand to Recognize how marketers use the customer journey model to influence purchase decisions on digital platforms.	K1
CO 3	Understand the benefits of integrating traditional and digital marketing.	K1,K2
CO 4	Understand the benefits and advantages to a business of using social media to engage an audience.	K2
CO 5	Understand the use of an active social media community.	K2

Text books :

(1) Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc

(2) Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC

(3) Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=bAgp3mGk_0w&list=PLLSovFY-eK2_1isRMtrNS_me4zDrs2CuS&index=4
Unit 2	https://www.youtube.com/watch?v=fO9RTyzc18I&list=PLLSovFY-eK2_1isRMtrNS_me4zDrs2CuS&index=5
Unit 3	https://www.youtube.com/watch?v=Z6RGDeXgcLc&list=PLLSovFY-eK2_1isRMtrNS_me4zDrs2CuS&index=11
Unit 4	https://www.youtube.com/watch?v=vGqRotPyF1U&list=PLLSovFY-eK2_1isRMtrNS_me4zDrs2CuS&index=16
Unit 5	https://www.youtube.com/watch?v=dIJrENoDhjc&list=PLLSovFY-eK2_1isRMtrNS_me4zDrs2CuS&index=21

MCA - FIRST YEAR SECOND SEMESTER					
Course Code	AMCA0216Z	L	T	P	Credit
Course Title	CRM ADMINISTRATION	2	0	0	2
Course objective: Understand the concepts of Sales force App. Understand the concepts of Lightning Experience. Familiarize with concepts administration. Learn Admin Essentials in Lightning Experience					
Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.					
Course Contents / Syllabus					
UNIT-I	Introduction				8 hours
Sales force Platform Basics, User Management, Data Modeling ,Data Management, Identity Basic , Data Security ,Lightning Experience Customization, Lightning APP Builder Sales force Mobile App Customization, User Engagement , Formulas and Validation, Data Security, Pick list Administration					
UNIT-II	Lightning & Sales force App Experience Customization				8 hours
Formula and Validation, Accounts and Contacts for Lightning Experience, Lead and Opportunity for Lightning Experience, Product Quotes and Contracts, Campaign Basic					
UNIT-III	Sales force Administration				8 hours
Service Cloud for lightning Experience, Sales force mobile app customization, App Exchange basic Duplicate Management Lightning Experience for Sales force Classic Users, Chatter Administration for Lightning Experience, Reports and Dashboards for lightning experience, Lightning experience customization, Lightning experience rollout , Sales force flow, Lightning experience report dashboard Specialist					
UNIT-IV	Lightning Experience				8 hours
Prepare Your Sales force Org for Users, Customize an Org to Support a New Business Unit, Protect Your Data in Sales force, Customize a Sales Path for Your Team, Customize a Sales force Object, Import and Export with Data Management Tools					
UNIT-V	Learn Admin Essentials in Lightning Experience				8 hours
Prepare Your Sales force Org for Users, Customize an Org to Support a New Business Unit, Protect Your Data in Sales force, Customize a Sales Path for Your Team, Customize a Sales force Object, Import and Export with Data Management Tools					
Course outcome: At the end of course , the student will be able to					
CO 1	Understand the basic working environment of Sales force				K1,K2
CO 2	Understand the concepts of Lightning & Sales force App Experience Customization				K1,K2
CO 3	Familiarize with concepts reports chatter administration				K3
CO 4	Understand the concepts of Lightning Experience				K1,K2
CO 5	Learn Admin Essentials in Lightning Experience				K1,K3
Text books :					
(1) Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc					
(2) Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC					
(3) Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education					
Link: NPTEL/ YouTube/ Faculty Video Link:					

Unit 1	https://www.youtube.com/watch?v=bxtqhfyoTjY&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=1
Unit 2	https://www.youtube.com/watch?v=ZkQwm-6lsIw&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=3
Unit 3	https://www.youtube.com/watch?v=iWbVm_o9Z0Q&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=8
Unit 4	https://www.youtube.com/watch?v=oG5y-ynaREY&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=11
Unit 5	https://www.youtube.com/watch?v=hKQTJ3L3opg&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=12

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0218	L	T	P	Credit
Course Title	Software Testing	2	0	0	2
Course objective: Give examples of why testing is necessary. Identify typical objectives of testing. Distinguish between error, defect, and failure. Explain the impact of context on the test process.					
Pre-requisites: Basic knowledge about software and its types. Basic knowledge of any programming language.					
Course Contents / Syllabus					
UNIT-I	Introduction				8 hours
Fundamentals of Testing: What is Testing, Typical Objectives of Testing, Testing and Debugging, Why is Testing Necessary? Quality Assurance and Testing, Errors, Defects, and Failures, Defects, Root Causes and Effects, Seven Testing Principles, Test Process, Traceability between the Test Basis and Test Work Products, The Psychology of Testing -Human Psychology and Testing, Tester's and Developer's Mindsets					
UNIT-II	Testing Throughout the Software Development Lifecycle				8 hours
Software Development Lifecycle Models, Software Development and Software Testing, Software Development Lifecycle Models in Context, Test Levels—Component Testing, Integration Testing, System Testing, Acceptance Testing, Test Types--Functional Testing, Non-functional Testing, White-box Testing, Change-related Testing,					
UNIT-III	Static Testing				8 hours
Static Testing Basics--Work Products that Can Be Examined by Static Testing, Benefits of Static Testing, Differences between Static and Dynamic Testing, Review Process--Work Product Review Process, Roles and responsibilities in a formal review, Review Types, Applying Review Techniques, Success Factors for Reviews					
UNIT-IV	Test Techniques				8 hours
Categories of Test Techniques-Categories of Test Techniques and Their Characteristics, Black-box Test Techniques, Equivalence Partitioning, Boundary Value Analysis, Decision Table Testing, State Transition Testing, Use Case Testing, White-box Test Techniques, Statement Testing and Coverage, Decision Testing and Coverage, The Value of Statement and Decision Testing, Checklist-based Testing.					
UNIT-V	Test Management				8 hours
Test Organization, Independent Testing, Tasks of a Test Manager and Tester, Test Planning and Estimation, Purpose and Content of a Test Plan, Test Strategy and Test Approach , Test Execution Schedule, Factors Influencing the Test Effort, Test Estimation Techniques, Test Monitoring and Control, Metrics Used in Testing, Configuration Management, Risks and Testing, Defect Management, Tool Support for Testing.					
Course outcome: After completion of this course students will be able to					
CO 1	Understand fundamental concepts of software testing				K1, K2
CO 2	Demonstrate understanding of how different development and testing practices, and different constraints on testing, may apply in optimizing testing to different contexts				K1, K2
CO 3	Understand test management principles for resources, strategies, planning, project control, and risk management				K2, K3

CO 4	Understand the project factors that drive the test priorities and test approach	K3
CO 5	Appreciate how testing activities and work products align with project objectives, measures, and targets	K5
Text books :		
(1) Lessons Learned in Software Testing, by Bret Pettichord, CemKaner, and James Marcus Bach		
(2) Foundations of Software Testing: ISTQB Certification, by Dorothy Graham and Erik P.W.M. Veenendaal		
(3) Software Testing: A Craftsman's Approach, Fourth Edition, by Paul C. Jorgensen		
Link: NPTEL/ YouTube/ Faculty Video Link:		
Unit 1	https://www.youtube.com/watch?v=KMj49syT8JM&list=PLyqSpQzTE6M-sBjDcT21Gpnj8grR2fDgc	
Unit 2	https://www.youtube.com/watch?v=Ln_LP7c23WM&list=PL9gSnSOLPFTAoJPbLSSdeXQE5cjP44Pki	
Unit 3	https://www.youtube.com/watch?v=Ln_LP7c23WM&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt	
Unit 4	https://www.youtube.com/watch?v=TSoLUKgnG_8&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=15	
Unit 5	https://www.youtube.com/watch?v=PIz7ust0bWE&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=31	

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0251N	L T P	Credit
Course Title	Object Oriented Programming with JAVA Lab	0 0 4	2
Course objectives:		The course enable the students to:	
1	To familiarize with Java IDE and basic programs.		K1
2	To introduce the Operator, arrays programs and oops concepts.		K2
3	Able to know packages, exception handling and string handling program of java.		K3
4	To understand the concurrency in Java and I/O Stream.		K4
5	To familiar with the concept of Swings, Generics, Collections and JDBC.		K5
Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.			
List of Experiments			
S.No.	Name of Experiment		
1.	Write a JAVA program to display default value of all primitive data type of JAVA		
2.	Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.		
3.	Write a JAVA program to implement constructor and constructor overloading.		
4.	Write a JAVA program implement method overloading and method overriding.		
5.	Write a JAVA program to implement Single Inheritance and multi-level inheritance.		
6.	Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?		
7.	Write a JAVA program that describes exception handling mechanism.		
8.	Write a JAVA program Illustrating Multiple catch clauses.		
9.	Write a Java program for handling mouse & key events.		
10.	Program a program in Java (a) that prints prime numbers between 1 to n. Number n should be accepted as command line input, (b) for getting address and name of the computer.		
11.	Write a JDBC program to select the all record in the table.		
12.	Write a Java program to insert the multiple records in a table by using Prepared Statement.		
13.	Write a Java program using thread.		
14.	Program for calling a method using class instance, and create a class fruit with the following attributes: <ul style="list-style-type: none">• Name of the fruit• Single fruit or bunch fruit		

	<ul style="list-style-type: none"> • Price <p>Define a suitable constructor and display Fruit () method that displays values of all the attributes.</p> <p>Write a program that creates 2 objects of fruit class and display their attributes.</p>	
15.	Program to sort the elements of an array in ascending order.	
Course outcomes: After completing this course student will be able to:		
CO 1	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.	K1, K5
CO 2	To identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem	K2, K5
CO 3	To demonstrate how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.	K3, K4
CO4	To demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.	K4
CO5	To Demonstrate the event handling process in GUI and JDBC based application in Java Programming language.	K5
Text books:		
(1.) Java; the complete reference, 7th edition, Herbert Scheldt, TMH.		
(2.) Understanding OOP with Java, updated edition, T. Budd, Pearson education.		
(3.) An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.		
References:		
1. An Introduction to OOP, third edition, T. Budd, Pearson education		
2. Introduction to Java programming, Y. Daniel Liang, Pearson education.		
3. An introduction to Java programming and object-oriented application development, R.A. Johnson-Thomson.		

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0252	L T P	Credit
Course Title	Database Lab	0 0 4	2
Course Objectives:			
The student should be made to:			
<ul style="list-style-type: none"> • Learn to create and use a database • Be familiarized with a query language • Have hands on experience on DDL Commands • Have a good understanding of DML Commands and DCL commands • Familiarize advanced SQL queries and PL/SQL 			
Suggested list of Experiment			
Sr. No.	Name of Experiment		
SQL Commands:			
1	Creation of a database and writing SQL queries to retrieve information from the database.		
2	Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.		
3	Creating an Employee database to set various constraints.		
4	Creating relationship between the databases.		
5	Creation of Views, Synonyms, Sequence, Indexes, save point		
PL/SQL :			
6	Write a PL/SQL block to satisfy some conditions by accepting input from the user.		
7	Creation of Procedures.		
8	Creation of database triggers and functions		
Basics of NoSQL:			
9	Introduction to NoSQL		
10	Connectivity with Database		
Lab Course Outcome: Upon the completion course, the student will be able to:			
CO 1	Design and implement a database schema for a given problem-domain	K1, K5	
CO 2	Implement the database connectivity with application	K2	
CO 3	Create and maintain tables using PL/SQL and Design the model of given problem using NoSQL	K3 , K4	
Text Book/ References			
1. Ivan Bayross, "SQL, PL/SQL the Programming Language of Oracle" 4 th Edition, , BPB publication			
2. Silberschatz, H. Korth and Sudarshan S., "Database System Concepts", 6th Edition, McGraw-Hill International, 2010			
3. Elmasri R. and ShamakantB.Navathe, "Fundamentals of Database Systems", 6th Edition, Addison Wesley , 2011			
4. Date C J, "An Introduction To Database System", Addison Wesley			

MCA - FIRST YEAR SECOND SEMESTER			
Course Code	AMCA0253N	L T P	Credit
Course Title	Data Structure Lab	0 0 4	2
Course objectives: The course enables the students:			
1	To familiarize with Turbo C editor, simple programs and array processing programs.		
2	To introduce the like stacks, queue, linked lists, trees, sparse matrices, graphs using various strategies involving use of arrays in programs.		
3	To familiar with the various states of data structures.		
4	To understand the time taken & draw graphs of performance and critically comment on the observations.		
5	To know efficient sorting and searching programs.		
Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.			
List of Experiments			
Sorting			
1. Sorting Algorithms-Non-Recursive.			
2. Sorting Algorithms-Recursive.			
Searching			
3. Searching Algorithm.			
Stacks implementation			
4. Implementation of Stack using Array.			
Queue Implementation			
5. Implementation of Queue using Array.			
6. Implementation of Circular Queue using Array.			
7. Implementation of Stack and Queues using Linked List.			
Tree and Binary Tree			
8. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.			
Graph Implementation			
9. Graph Implementation, BFS, DFS, Minimum cost spanning tree, shortest path algorithm			
File Handling			
10. File Handling using Structure and File handling concepts			
Note: Experiment may vary or be changed as per the requirement.			
Course outcomes: After completing this course student will be able to:			

CO 1	Implement C programs for solving mathematical problems, array processing problems, taking care of all input, output possibilities and error conditions.	K4
CO 2	Implement various data structures like stacks, queue, linked lists, trees, sparse matrices, graphs using various strategies involving use of arrays, and DMA	K2, K5
CO 3	Draw visual representations of various states of data structures.	K1
CO 4	Measure the time taken by a program practically, draw graphs of performance and critically comment on the observations.	K3
CO 5	Write efficient sorting and searching programs.	K4

Text books / References:

(1.) Y. Langsam, M. Augenstein and A. Tannenbaum, Data Structures using C and C++, Pearson Education Asia, 2nd Edition, 2002.
(2.) Ellis Horowitz, S. Sahni, D. Mehta Fundamentals of Data Structures in C++, Galgotia Book Source, New Delhi.
(3.) Timothy A. Budd, —Exploring Python ⁴ , Mc-Graw Hill Education (India) Private Ltd., 2015.
(4.) S. Lipschutz, Data Structures Mc-Graw Hill International Editions, 1986.
(5.) Jean-Paul Tremblay, Paul. G. Soresan, An introduction to data structures with Applications, Tata Mc-Graw Hill International Editions, 2nd edition 1984.
(6.) A. Michael Berman, Data structures via C++, Oxford University Press, 2002
(7.) M. Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education, 2002, 2 nd edition

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0214P	L T P	Credit
Course Title	Fundamentals of Digital Marketing and Analytics Lab	0 0 2	1
Course objectives:			
Review key trends within the Digital Marketing landscape. Explain the holistic impact of all Digital Marketing channels. Examine an example of each Digital Marketing channel.			
Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.			
The programs in Digital Marketing and Analytics Lab will cover the following concepts:			
1. Create a Chart with a spreadsheet			
2. Create and edit a Google Sheet			
3. Share the Google Sheet			
4. Create Custom Data Table and Sort It.			
5. Use COUNTIF, MIN, MAX, AVERAGE, SUM functions			
6. Handling FORMULAS in Spreadsheet			
7. Find Errors in functions			
8. Clean data by Sorting and Filtering			
9. Create your custom table with BigQuery			
10. Query Your Dataset using BigQuery			
Course outcomes: After completing this course student will be able to :			
CO 1	Gain experience in developing a 'Digital marketing plan'		K6
CO 2	Gain experience with time management around meeting project deadlines		K2, K6
CO 3	Develop their own presentation/speaking styles and learn effective methods of doing so through feedback on their own presentation as well as observation of other students' presentations		K6
Text books:			
1. Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015).			
2. Eric Greenberg, and Kates, Alexander; Strategic Digital Marketing: Top Digital Experts Share the Formula for Tangible Returns on Your Marketing Investment; McGraw-Hill Professional (October, 2013).			
Reference book:			
1. Menon, Arpita; Media Planning and Buying; McGraw Hill (1st Edition, 2010)			

2. Arnold, George; Media Writer's Handbook: A Guide to Common Writing and Editing Problems; McGraw-Hill Education; (5th edition, 2008)

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0215P	L T P	Credit
Course Title	Fundamentals of Digital Marketing and Optimization Lab	0 0 2	1
Course objectives:			
Fundamentals of Digital Marketing and Optimization. Develop a basic display campaign and allocate ad dollars for success. Examine the pricing models for display and evaluate the best possible choice for your campaign.			
Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.			
The programs in Digital Marketing and Optimization Lab will cover the following concepts :			
<ol style="list-style-type: none"> 1. Basic Explanation and Setups: <ol style="list-style-type: none"> a. Name servers, theme & plugins setup b. Basic SEO, How Search Engine Works? c. Crawling, Indexing, Ranking d. GSC, Google Analytics, GTM, Google Alerts 			
<ol style="list-style-type: none"> 2. Content Frameworks: <ol style="list-style-type: none"> a. Keyword (Explanation, Research, Ranking factor) b. Keyword Classification, Finding Right Keyword c. Competitive Keyword Research Content framework 			
<ol style="list-style-type: none"> 3. On Page: <ol style="list-style-type: none"> a. Element Explanation b. Title Tag, Header Tags c. Meta Description, The Body d. URL Structure, Images 			
<ol style="list-style-type: none"> 4. Technical SEO Part – I <ol style="list-style-type: none"> a. Elements Explanation b. Site Architecture, Website Structure c. Understand Google Crawlability d. Robots.txt, Sitemaps, Mobile SEO, AMP 			
<ol style="list-style-type: none"> 5. Technical SEO Part –II <ol style="list-style-type: none"> a. WordPress Speed Optimization b. CDN c. Structured Data d. Security 			
Course outcomes: After completing this course student will be able to :			
CO 1	Analyze the role that social marketing plays in the digital landscape and		K6

	marketing mix.	
CO 2	Explain the differences between, and the convergence of, paid, earned, and owned media.	K2, K6
CO 3	Identify and incorporate individual social and mobile platforms into a digital marketing strategy.	K6
Text books:		
1) Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc.		
2) Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC		
3) Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education		
Reference book:		
1) New Rules of Marketing and PR, Author: David Meerman Scott, Latest Edition: 6th Edition, Publication: John Wiley & Sons		
2) Social Media Marketing All-in-one Dummies, Author: Jan Zimmerman, Deborah Ng, and Latest Edition: 4th Edition, Publication: John Wiley & Sons Inc.,		

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0216P	L TP	Credit
Course Title	CRM Administration Lab	0 02	1

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, understand the technological and human issues relating to implementation of Customer Relationship Management in the organizations.

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

The programs in lab will cover the following concepts:

1. Quick Start: Lightning App Builder
2. Prepare Your Salesforce Org for Users
3. Customize an Org to Support a New Business Unit
4. Protect Your Data in Salesforce
5. Customize a Sales Path for Your Team
6. Setup the service Console
7. Build a discount approval process
8. Quick start process builder
9. Build a simple flow
10. Build a battle station App
11. Customize a Salesforce Object
12. Create Reports and Dashboards for Sales and Marketing Managers
13. Improve Data Quality for Your Sales and Support Teams
14. Create a Process for Managing Support Cases

Course outcomes: After completing this course student will be able to:

CO 1	Understand the basic concepts of Customer relationship management.	K6
CO 2	To understand marketing aspects of Customer relationship management.	K2, K6
CO 3	Understand basics of operational Customer relationship management.	K6

Text books:

1. Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition),

PHI Learning, 2018	
2. Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019	
3. Salesforce for beginners by ShaarifSahaalane book by Amazon (Online edition)	
Reference book:	
1. Salesforce Essentials for Administrators , By ShrivasthavaMohith, Edition Ist ,2018	
2. Salesforce : A quick Study laminated Reference Guide by Christopher Mathew Spencer eBook by Amazon (Online)	
3. Mastering Salesforce CRM Administration By Gupta Rakesh Edition IInd 2018	
ReferenceLinks:	
1.	www. Trailhead.salesforce.com
2.	www.mindmajix.com/salesforce-tutorial
3.	www,youtube.com/watch?v=7K42geizQCI

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCA0218P	L T P	Credit
Course Title	Software Testing Lab	0 0 2	1
Course objectives:			
Understand UML and how to create class diagram. Understanding how to create use case diagram, sequence diagram, collaboration diagram. Understand how to create Activity diagram, Component diagram, and deployment diagram			
Pre-requisites: Basic knowledge about software and its types.			
The programs in Software Testing lab will cover the following concepts:			
1. Introduction to UML			
2. Class Diagram for ATM.			
3. Use Case Diagram for ATM			
4. Sequence Diagram for ATM			
5. Collaboration Diagram for ATM			
6. State chart Diagram for ATM.			
7. Activity Diagram for ATM.			
8. Component Diagram for ATM			
9. Deployment Diagram for ATM			
10. Write a program in C language in demonstration the working of the following constructs i) do. While ii) while.do iii) if...else iv) switch v) for			
11. A program for written in C language for Matrix Multiplication fails introspect the causes for its failure and write down the possible reasons for its failure			
12. Take ATM system and study its system specifications and report various bugs.			
13. Write the test cases for banking application.			
Course outcomes: After completing this course student will be able to:			
CO 1	Understand UML and how to create class diagram		K6
CO 2	Understanding how to create use case diagram, sequence diagram, collaboration diagram.		K2, K6
CO 3	Understand how to create Activity diagram, Component diagram, and deployment diagram.		K6
Text books:			
1. Lessons Learned in Software Testing, by Bret Pettichord, CemKaner, and James Marcus Bach1			

2. Foundations of Software Testing: ISTQB Certification, by Dorothy Graham and Erik P.W.M. Veenendaa2
3. Software Testing: A Craftsman's Approach, Fourth Edition, by Paul C. Jorgensen

Reference book:

1. The Art of Software Testing, by Glenford Myers
2. Software Test Automation, by Dorothy Graham and Mark Fewster
3. Software Testing and Quality Assurance: Theory and Practice, by Kshirasagar Naik and Priyadarshi Tripathy

ReferenceLinks:

1. https://www.youtube.com/watch?v=_jb0cyGbdbk
2. <https://www.youtube.com/watch?v=7wo9PHfkyik>
3. <https://www.youtube.com/watch?v=UI6lqHOVHic>
4. https://www.youtube.com/watch?v=gUEizau0UQ&list=PLWPirh4EWFpF9Gbnu4_DdF4ITHSN6MSsk

MCA - FIRST YEAR SECOND SEMESTER

Course Code	AMCANC0201	L	P	T	Credit
Course Title	Cyber Security	2	0	0	0
Course objective:					
1	Achieve knowledge about Security of Information system and Risk factors.				
2	Able to examine security threats and vulnerability in various scenarios.				
3	Incorporate the design methodology for system security and web security.				
4	Understand concept of cryptography and encryption technique to protect the data from cyber attack				
5	Able to design policy and strategy which diminish crimes in this domain and provide protection for software and hardware.				
Pre-requisites: Basics recognition in the domain of Computer Science, Concept of network and operating system					
Course Contents / Syllabus					
UNIT-I	INTRODUCTION	8 hours			
Introduction to Information Systems: Types of Information Systems, Development of Information Systems, Need for Information Security, Threats to Information Systems, Information Assurance, Guidelines for secure password and wi-fi security and social media and Windows security Cyber Security, and Security Risk Analysis, Risk Management					
UNIT-II	APPLICATION LAYER SECURITY	8 hours			
Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control, Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security ,Threats to E-Commerce: Electronic Payment System, e-Cash, Issues with Credit/Debit Cards.					
UNIT-III	SECURE SYSTEM DEVELOPMENT	8 hours			
Application Development Security, Architecture & Design ,Security Issues in Hardware: Data Storage & Downloadable Devices,mobile protection ,Security threats involving in Social Media, Physical Security of IT Assets, Access Control, CCTV and Intrusion Detection Systems, Backup Security Measures					
UNIT-IV	CRYPTOGRAPHY	8 hours			
Public key Cryptography, Digital signature, Public key distribution ,Real world protocols: Basic terminologies, Email security certificates, Transport Layer security, IP security, DNS security					
UNIT-V	SECURITY POLICY	8 hours			
Policy design Task, WWW Policies, Email based Policies, Policy Revaluation Process-Corporate Policies-Sample Security Policies, Publishing and Notification Requirement of the updated and new Policies. Evolving Technology Security – Mobile, Cloud, and Security in supply chain management					
Course outcome: At the end of course, the student will be able to					
CO 1	Analyze and evaluate the cyber security needs of an organization.	K ₁ , K ₂			
CO 2	Determine and analyze software vulnerabilities and security solutions.	K ₃			

CO 3	Comprehend IT Assets security (hardware and Software) and performance indicators	K ₂
CO 4	Measure the performance and encoding strategies of security systems.	K ₃
CO 5	Design operational a cyber security methods and policies to enhance current scenario security.	K ₃ , K ₆

Text books

Charles P. Pfleeger, Shari LawerancePfleeger, “Analysing Computer Security”, Pearson Education India

V.K.Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India

Sarika Gupta & Gaurav Gupta, Information Security and Cyber Laws, Khanna Publishing House

Michael E. Whitman and Herbert J Mattord "Principle of Information Security" Cengage

Reference Books

Schou, Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw Hill.

Chander, Harish,” Cyber Laws And It Protection ” , PHI Learning Private Limited ,Delhi

V.K. Jain, Cryptography and Network Security, Khanna Publishing House, Delhi

William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010

E-books& E-Contents:

<https://prutor.ai/welcome/>

<https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

<https://cybermap.kaspersky.com/stats>

<https://www.fireeye.com/cyber-map/threat-map.html>

Reference Links

<https://crypto.stanford.edu/cs155old/cs155-spring11/lectures/03-ctrl-hijack.pdf>

<https://cs155.stanford.edu/lectures/03-isolation.pdf>

http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf

https://www.youtube.com/watch?v=_9QayISruzo