

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(An Autonomous Institute)



Affiliated to

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



Evaluation Scheme & Syllabus

For

Master of Computer Applications, (Integrated)

Third Year

Effective from the Session: (2026-27)

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

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	BMICA0501	Design and Analysis of Algorithms	Mandatory	3	1	0	30	20	50		100		150	4
2	BMICA0502	Web Technology	Mandatory	4	0	0	30	20	50		100		150	4
3	BMICA0503	Software Testing and Applications	Departmental Elective	3	1	0	30	20	50		100		150	4
4	BMICA0504	Organizational Behavior	Mandatory	3	0	0	30	20	50		100		150	3
5		Elective-I	Mandatory	3	0	0	30	20	50		100		150	3
6	BMICA0551	Design and Analysis of Algorithms Lab	Mandatory	0	0	4				50		50	100	2
7	BMICA0552	Web Technology Lab	Mandatory	0	0	4				50		50	100	2
8	BMICA0553	Software Testing and Application Lab	Mandatory	0	0	4				50		50	100	2
9	BMICA0559	Internship Assessment-II	Mandatory	0	0	2				50		50	100	1
10	BMICANC0501 / BMICANC0502	Constitution of India, Law and Engineering / Essence of Indian Traditional Knowledge	Compulsory Audit	2	0	0	30	20	50		50		100	NA
11		*MOOCs	*MOOCs											
		TOTAL							250	200	500	200	1150	25

List of MOOCs (Infosys Springboard) Based Recommended Courses for Third Year (Semester-V) MCA (Integrated)

S. No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours
1	BMC0028	HTML5 - The Language	Infosys Wingspan (Infosys Springboard)	13h 17m
2	BMC0043	Testing Fundamentals	Infosys Wingspan (Infosys Springboard)	8h 27m

PLEASE NOTE: -

- **Internship(2-3weeks) shall be conducted during summer break after IV semester and will be assessed during V semester**
- **Compulsory Audit Courses (Non-Credit – BMICANC0501/BMICANC0502)**
 - 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.
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

List of Department Elective (if any):-

Sl. No.	Subject Codes	Subject Name	Types of Subjects	Bucket Name	Applicable Branch	Semester
1	BMICA0511	Artificial Intelligence	Elective	Testing & Gaming	MCA-INT	V
2	BMICA0512	Fundamentals of Digital Marketing and Optimization	Elective	Digital Marketing	MCA-INT	V
3	BMICA0513	CRM Fundamentals	Elective	CRM Using Salesforce	MCA-INT	V

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
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MCA(Integrated)
Evaluation Scheme
SEMESTER VI

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	BMICA0601	Advance Java	Mandatory	3	1	0	30	20	50		100		150	4
2	BMICA0602	Computer Graphics and Multimedia	Mandatory	4	0	0	30	20	50		100		150	4
3	BMICA0603	Computer Networks	Mandatory	3	1	0	30	20	50		100		150	4
4	BMICA0604	Distributed System	Mandatory	4	0	0	30	20	50		100		150	4
5		Departmental Elective-II	Departmental Elective	3	0	0	30	20	50		100		150	3
6	BMICA0651	Advance Java Lab	Mandatory	0	0	4				50		50	100	2
7	BMICA0652Z	Computer Graphics and Multimedia Lab	Mandatory	0	0	4				50		50	100	2
8	BMICA0653Z	Computer Network Lab	Mandatory	0	0	4				50		50	100	2
9	BMICANC0602/ BMICANC0601	Essence of Indian Traditional Knowledge/ Constitution of India, Law and Engineering	Compulsory Audit	2	0	0	30	20	50		50		100	NA
		*MOOCs	*MOOCs											
		TOTAL							250	150	500	150	1050	25

List of MOOCs (Infosys Springboard) Based Recommended Courses for Third Year (Semester-VI) MCA (Integrated)

S. No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours
1	BMC0044	Java 11 Beyond Basics	Infosys Wingspan (Infosys Springboard)	33h 13m
2	BMC0027	Network Fundamentals	Infosys Wingspan (Infosys Springboard)	37h 57m

PLEASE NOTE: -

- **Compulsory Audit Courses (Non-Credit – BMICANC0602/BMICANC0601)**
 - 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.
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

List of Department Elective (if any):-

Sl. No .	Subject Codes	Subject Name	Types of Subjects	Bucket Name	Applicable Branch	Semester
1	BMICA0611Z	Machine Learning	Elective	Testing & Gaming	MCA-INT	VI
2	BMICA0612Z	Fundamentals of Digital Marketing and Analytics	Elective	Digital Marketing	MCA-INT	VI
3	BMICA0613Z	CRM Administration	Elective	CRM Using Salesforce	MCA-INT	VI

Course Code: BMICA0501			Course Name: Design and Analysis of Algorithm				L	T	P	C
Course Offered in: MCA Integrated							3	1	0	4
Pre-requisite: Basic knowledge of programming, data structures and mathematics.										
Course Objectives:										
Analyze asymptotic performance of algorithms designed using different computational model. Study advanced data structures like Red black Tree, binomial and Fibonacci heap and learn the concept of complexity classes.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Analyze and understand the asymptotic performance of algorithms and write rigorous correctness proofs for algorithms							K2,K4		
CO2	Apply and use efficient sorting and searching techniques according to the problem							K3		
CO3	Apply divide and conquer and greedy algorithm approach for solving different problems such as Prim's & Kruskal's etc							K3		
CO4	Apply important algorithmic design paradigms and methods of analysis such as dynamic programming, backtracking, branch and bound.							K5		
CO5	Demonstrate tractable and intractable problems and graph algorithms							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	1	1	-	-	-	1		
CO2	3	3	2	2	-	-	-	2		
CO3	2	3	3	2	-	-	-	1		
CO4	2	3	3	2	1	-	-	1		
CO5	2	3	2	2	1	-	-	1		
Course Contents / Syllabus										
Unit 1		Introduction							10 hours	
Introduction: Problem Definition, Algorithm Specification-Simple example of design and analysis of time complexity, Performance Analysis: Space Complexity and Time complexity, Asymptotic Notation. Analysis of Algorithm: Orders of Magnitude (Asymptotic notations), Growth rates, Average and worst case analysis ,Analyzing control statements, Recurrence Relations substitution, change of variables										
Unit 2		Sorting and Searching							10 hours	
Sorting and searching algorithms: Selection sort, Bubble sort, Insertion sort, Sorting in linear time: Count sort, Binary search & linear search. Nave String Matching & Rabin-Karp Algorithm. Binary Search Tree Algorithm										
Unit 3		Divide and Conquer and Greedy Method							15 hours	
Divide and Conquer and Greedy Method: Divide and Conquer concepts with Examples Such as Quick sort, Merge sort, Strassen's Matrix Multiplication, Convex Hull, Searching. Greedy Methods with Examples Such as Activity Selection, Task scheduling, Knapsack (Fractional), Minimum Spanning Trees – Prim's and Kruskal's, Algorithms, Single Source Shortest Paths - Dijkstra's and Bellman Ford Algorithms, Huffman codes										
Unit 4		Dynamic Programmin g, Branch and Bound							15 hours	
Dynamic Programming: Dynamic Programming concepts, Examples Such as All Pair Shortest Paths – Warshal's and Floyd's Algorithms, 0/1 Knapsack, Longest Common Sub Sequence, Matrix Chain Multiplication, Resource Allocation Problem. Branch and Bound: Branch and Bound with Examples Such as Travelling Salesman Problem, Graph Coloring.										



Unit 5	Graph Algorithm and Back Tracking	10 hours
Graph Algorithm: An introduction using graphs and games, Traversing Trees– Pre conditioning, Depth First Search, Undirected Graph, Directed Graph, Breath First Search. Height Balanced, m-way and RB-Tree Backtracking: The Knapsack Problem, the 4/8/n-queens problem, Sum of Subsets		
Total Lecture Hours		60 hours
Textbooks:		
		Authors Name
1. Introduction to Algorithms, MIT Press, 4th Edition , 2022		Thomas H. Cormen
2. Introduction to the Design and Analysis of Algorithms, Pearson Publication, 3rd Edition , 2012		Anany Levitin
Reference Books:		
1. Design and Analysis of Algorithms, Pearson Education, 1st Edition , 2014		S. Sridhar
2. Algorithm Design, Pearson Education, 1st Edition , 2013		Jon Kleinberg and Eva Tardos
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	01Hrs 25Min
Video Lectures	https://www.youtube.com/playlist?list=PLxCzCOWd7aiHcmS4i14bI0VrMbZTUvITa https://www.youtube.com/results?search_query=Jenny%27s+Lectures+Design+and+Analysis+of+Algorithms+playlist https://www.youtube.com/results?search_query=Knowledge+Gate+Design+and+Analysis+of+Algorithms+playlist	01Hrs 25Min 01Hrs 39Min 01Hrs 05Min
Web References	https://www.pearson.com/en-us/subject-catalog/p/introduction-to-the-design-and-analysis-of-algorithms/P200000003403?utm_source=chatgpt.com https://www.geeksforgeeks.org/design-and-analysis-of-algorithms/?utm_source=chatgpt.com https://www.programiz.com/dsa	



Course Code: BMICA0502			Course Name: Web Technology					L	T	P	C
Course Offered in: MCA Integrated								4	0	0	4
Pre-requisite: Web technology refers to the tools, protocols, and languages such as HTML, CSS, JavaScript, and HTTP that are used to create, display, and manage websites and web applications on the internet.											
Course Objectives:											
1. To Develop an ability to design and implement static and dynamic website											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Discuss the concepts of Web Designing.							K1			
CO2	Design a responsive website using HTML and CSS							K5			
CO3	Implement interactive webpages using HTML, CSS, and JavaScript							K3			
CO4	Apply web designing concepts by database connectivity with JDBC in the current market Place							K4			
CO5	Analyze and build dynamic web pages using client-side programming JavaScript and also Develop the web application using servlet and JSP.							K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	1	-	-	-	-	-	1			
CO2	2	2	3	2	-	-	-	1			
CO3	2	2	3	3	-	-	-	1			
CO4	2	3	2	3	-	1	-	1			
CO5	2	3	3	3	1	1	1	2			
Course Contents / Syllabus											
Unit 1		Introduction							15 hours		
Introduction: Web Technology, Web and web Protocols Governing Web, HTTP Protocol: Request and Response, Web browser and Webservers, Features of Web 2.0.											
Web Designing: Concepts of effective web design, Web design issues including Browser, Bandwidth, display resolution, Page Layout and linking, User centric design, Sitemap, Planning and publishing website											
Unit 2		HTML & CSS							10 hours		
HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, Frames and Framesets. HTML forms											
Style Sheets: Introduction to CSS, need for CSS, basic syntax and structure, using CSS, background images colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, Positioning using CSS											
Unit 3		Javascript & Xml							17 hours		
JavaScript: Client-side scripting with JavaScript, variables, functions, conditions, loops and repetition, Popup boxes. Advance javascript: JavaScript and objects, JavaScript toward objects-the DOM and web browser environments, Manipulation using DOM, forms and validations .DHTML: Combining HTML, CSS and JavaScript, Events and buttons. XML: Introduction to XML											
Unit 4		JDBC & Java Beans							12 hours		



JDBC: Introduction to JDBC, JDBC architecture, JDBC Connection steps, Perform JDBC manipulation, Statement, Prepared Statements, Transaction Processing
Java Beans: Introduction to Java Beans

Unit 5	Servlets & JSP	06 hours
Servlets: Servlet Overview and Architecture, Servlet Life Cycle, Handling HTTP methods, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking withHttp Session.		
Java Server Pages (JSP): Introduction, Java Server Pages Overview, A First Java Server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.		

Total Lecture Hours **60 hours**

Textbooks:

	Authors Name
1. HTML, DHTML, JavaScript, and PHP, BPB Publications, 4th Edition , 2019	Ivan Bayross
2. Web Technology and Design, New Age International, 2nd Edition , 2022	C. Xavier

Reference Books:

	Authors Name
1. Web Technologies: Black Book, Dreamtech Press, 2nd Edition , 2018	Kogent Learning Solutions
2. Web Programming: Building Internet Applications, Wiley India, 1st Edition , 2011	Chris Bates

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	00Hrs 38Min
Video Lectures	00Hrs 25Min 00Hrs 39Min 01Hrs 05Min
Web References	



Course Code: BMICA0503			Course Name: Software Testing and Applications				L	T	P	C
Course Offered in: MCA Integrated							3	1	0	4
Pre-requisite: Basic knowledge of Computer Science.										
Course Objectives:										
Study fundamental concepts of software testing and its application in various scenarios with the help different testing strategies, methods and tools										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Describe the concepts of software testing.							K1		
CO2	Demonstrate understanding of how different development and testing practices, and different constraints on testing, may apply in optimizing testing to different Contexts							K5		
CO3	Apply test management principles for resources, strategies, planning, project control, and risk management.							K3		
CO4	Analyze the project factors that drive the test priorities and test approach.							K4		
CO5	Design how testing activities and work products align with project objectives, measures, and targets.							K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1		3	1	-	-	-	-	-	1	
CO2		2	3	2	2	-	-	-	1	
CO3		-	2	1	1	2	3	1	-	
CO4		1	3	2	2	-	2	-	-	
CO5		1	2	3	2	1	2	1	1	
Course Contents / Syllabus										
Unit 1		Introduction							10 hours	
Introduction: Software Testing, Importance of testing, Roles and Responsibilities, Testing Principles, Attributes of Good Test, Test Case-Test Scenario, Bug, Failure , Defect, Fault ,SDLC , STLC.										
Unit 2		Types Of Testing							10 hours	
Testing Strategies: Unit Testing, Integration Testing, System Testing, Smoke, Regression Testing, Acceptance Testing. Clean Room, Software Engineering. Functional/Non- Functional Testing. Testing Tools										
Categorization of testing methods: Manual Testing, Automation Testing and Automated Testing Vs. Manual Testing										
Unit 3		Non-Functional testing							15 hours	
Performance Testing: -Load testing, Stress testing, Scalability testing, Volume Testing, Configuration Testing, Regression Testing,Compatibility Testing, Recovery Testing, Maintenance Testing, Documentation Testing, Usability Testing, Efficiency Testing , Reliability Testing , Accountability Testing, Security Testing , Portability Testing.										
Unit 4		Software Testing Methodology							15 hours	
Types of Testing: Validation & Verification, White/Glass Box Testing, Black Box Testing, Grey Box Testing, Statement Coverage Testing, Branch Coverage Testing, Path Coverage Testing, Conditional Coverage Testing, Loop Coverage Testing, Boundary Value Analysis, Equivalence Class Partition, State Based Testing, Cause Effective Graph, Decision Table, Use Case Testing, Exploratory testing and Testing Metrics										
Unit 5		Software Testing Life Cycle and Test cases							10 hours	



Software Testing Life Cycle: Requirements Analysis/Design, Traceability Matrix, Test Planning, Objective, Scope of Testing, Schedule, Approach, Roles & **Responsibilities**, Assumptions, Risks & Mitigations, Entry & Exit Criteria, Test Automation, Deliverables.

Test Cases Design: Write Test cases, Review Test cases, Test Cases Template, Types of Test Cases, Difference between Test Scenarios and Test Cases. Test Environment setup, Understand the SRS, Hardware and software requirements, Test Data.

		Total Lecture Hours	60 hours
Textbooks:		Authors Name	
1. Software Engineering: A Practitioner's Approach, McGraw-Hill International, 7th Edition, 2010		Roger S. Pressman	
2. Software Testing: Principles and Practices, Pearson Education, 2nd Edition, 2017		Srinivasan Desikan and Gopalaswamy Ramesh	
Reference Books:		Authors Name	
1. Software Engineering, Pearson Education, 10th Edition, 2015		Ian Sommerville	
2. Introduction to Software Testing, Cambridge University Press, 2nd Edition, 2016		Paul Ammann and Jeff Offutt	
Self-Study Content Links:		Duration (in Hrs)	
MOOCs	https://onlinecourses.nptel.ac.in/noc23_cs38/preview?utm_source=nptel&utm_medium=course&utm_campaign=cs38 https://nptel.ac.in/courses/106105150?utm_source=nptel&utm_medium=course&utm_campaign=106105150	15Hrs 00Min 12Hrs 00Min	
Video Lectures	https://www.youtube.com/watch?v=LA_N8cvmLBI https://www.youtube.com/@sdetqa/playlists https://www.youtube.com/@RaghavPal/playlists	00Hrs 25Min 00Hrs 39Min 01Hrs 05Min	
Web References	https://www.guru99.com/software-testing.html https://www.softwaretestinghelp.com https://www.qafeast.com		

Course Code: BMICA0504				Course Name: Organizational Behavior				L	T	P	C
Course Offered in: MCA Integrated								3	0	0	3
Pre-requisite: Basic understanding and foundational knowledge of general communication skills..											
Course Objectives:											
This course explores the theories and concepts of organisational behaviour and their application in the workplace. It covers individual behaviour, group dynamics, and managerial processes to enhance effectiveness. The Organizational Behaviour course focuses on a better understanding of the key factors that determine human behaviour in organisations. The course focuses on critical factors for understanding people's behaviour in organisational contexts from a socio-psychological point of view that play an essential role in people management. That is the basis of any leadership course in the rest of the program.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Demonstrate a sound understanding of the prominent theories, concepts and models that are used to understand and analyze human behaviour in organizations								K4		
CO2	Analyze the elements of group dynamics and solve applied problems related to group Behavior								K3		
CO3	Develop practical insights into perception and apply motivational theories for effectively managing the Organizational people and processes								K3		
CO4	Apply conceptual knowledge of theory and models relevant to leadership and Change in organizations.								K3		
CO5	Display a working understanding of organizations as institutions including issues of structure, power, politics and conflicts.								K2		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	1	1	-	-	-	1			
CO2	3	3	2	2	-	-	-	1			
CO3	2	3	3	2	-	-	-	1			
CO4	2	3	3	2	-	-	-	1			
CO5	2	3	2	2	-	-	-	1			
Course Contents / Syllabus											
Unit 1		Introductio n to OB, Personality & Attitude							09 hours		
Fundamentals of individual behaviour, Models of OB, Organizational Climate and Culture, Personality-Determinants of Personality, types of personality, Personal effectiveness. Attitudes: Meaning, Types, Components, Theory of attitude formation											
Unit 2		Foundation of Group Behaviour							09 hours		
Group: Meaning, types, group dynamics, group cohesiveness, Team Building, Tuckman Model of Team Development. Meaning of Interpersonal Behaviour & Interpersonal skills, Transactional Analysis, Johari Window											
Unit 3		Motivation, Perception							09 hours		
Meaning & definition, Traditional theory of Motivation: Maslow's, Herzberg's, McClelland, Contemporary											



theories of Motivation: Self Determination Theory, Self-Efficacy Theory, Vroom's Expectancy Theory, Equity Theory, Reinforcement Theory. Meaning, process, principles and errors of perception, managerial & behavioural applications of perception.

Unit 4	Leadership, Organizational Change	09 hours
Leadership, types of leaders and leadership styles, traits and qualities of effective leader, trait theory, LSM – Leadership Situational Model, Meaning of organizational change, approaches to managing organizational change, creating a culture for change, implementing the change, Kurt Lewin Model of change.		
Unit 5	Organizational Power and Politics, Conflict Management	09 hours
Organizational Power: Definition, Types of powers, Sources and Characteristics, Effective use of power, Organizational Politics: Factors and Impact. Organizational conflict: Constructive and Destructive conflicts, Conflict Process, Strategies for resolving destructive conflict		
Total Lecture Hours		45 hours

Textbooks:

	Authors Name
1. Organizational Behaviour, Pearson Education India, 18th Edition , 2019	Stephen P. Robbins, Timothy A. Judge, and Neharika Vohra
2. Understanding Organizational Behaviour, Oxford University Press, 3rd Edition , 2018	Udai Pareek
3. Organizational Behaviour, Cengage Learning, 13th Edition , 2019	Steven L. McShane and Mary Ann Von Glinow

Reference Books:

	Authors Name
1. Organizational Behaviour, McGraw-Hill Education, 18th Edition , 2021	Stephen P. Robbins and Timothy A. Judge
2. Organizational Behaviour, Pearson Education, 16th Edition , 2019	Fred Luthans
3. Organizational Behaviour: Text and Cases, McGraw-Hill Education (India), 15th Edition , 2018	K. Aswathappa

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	01Hrs 05Min
Video Lectures	https://www.youtube.com/watch?v=X_u3v4ocg_E https://www.youtube.com/watch?v=-sLHfYnxh8s https://onlinecourses.nptel.ac.in/noc23_mg73/preview https://bca.fizikamind.com/organisational-behaviour-meaning-need-and-importance-ob-discipline-ob?utm_source=chatgpt.com	5Hrs 25Min 00Hrs 39Min 01Hrs 05Min 02Hrs 05Min
Web References	https://www.tutorialspoint.com/organizational_behavior/index.htm https://www.mindtools.com?utm_source=chatgpt.com https://www.geeksforgeeks.org/organizational-behaviour	



Course Code: BMICA0511				Course Name: Aritificial Intelligence				L	T	P	C
Course Offered in: MCA Integrated								3	0	0	3
Pre-requisite: Basic Knowledge of Transform techniques											
Course Objectives:											
Introduce knowledge of historical perspective of AI and its foundations and familiarity with principles of AI toward problem solving, inference, perception, knowledge representation, and learning.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Describe the history of Artificial intelligence (AI) and its foundations								K2		
CO2	Apply principles of AI in solutions that require problem solving, inference and perception.								K3		
CO3	Explain the important AI techniques, including intelligent search methods and solutions								K2		
CO4	Apply the concepts of knowledge & reasoning of predicate logic and representing knowledge using rules & Probabilistic reasoning								K3		
CO5	Evaluate the AI techniques presented and apply them to 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	1	-	-	-	-	-	1			
CO2	3	3	2	2	-	-	-	1			
CO3	3	3	2	2	-	-	-	1			
CO4	3	3	3	2	-	-	-	1			
CO5	2	3	3	3	-	-	1	1			
Course Contents / Syllabus											
Unit 1		Introduction to AI								09 hours	
Introduction to Artificial Intelligence,Historical developments of Artificial Intelligence, well defined learning problems, Designing a Learning System, Basics of problem-solving: problem representation paradigms, state space, Problem reduction, Constraint satisfaction, Applications of AI											
Unit 2		Search Techniques								09 hours	
Searching for solutions, Uninformed Search Strategies: DFS, BFS, Informed Search Strategies: Local search algorithms and optimistic problems, adversarial Search, Search for games, minimax, Alpha - Beta pruning, Heuristic Search techniques, Hill Climbing, Best-first search, Means Ends Analysis, Iterative deepening Heuristic Search and A*.											
Unit 3		Logic And Knowledge Representation								09 hours	
Introduction of Logic, Propositional Logic Concepts, Semantic Tableaux and Resolution in Propositional logic, FOPL, Semantic Tableaux and Resolution in FOPL, Logic Programming in Prolog. Production systems and rules for some AI problems: Water Jug Problem, Missionaries-Cannibals Problem, n-Queen problem, monkey banana problem, Travelling Salesman Problem. Knowledge representation, semantic nets, partitioned nets, parallel implementation of semantic nets. Frames, Common Sense reasoning and thematic role frames.											
Unit 4		Expert System								09 hours	



Architecture of knowledge-Based System, Rule-based systems, Forward and Backward Chaining, Frame Based systems. Architecture of Expert System, Agents and Environment, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit 5	Planning And Uncertainty	09 hours
Planning with state Space Search, Conditional Planning, Continuous planning, Multi-Agent Planning, Forms of learning, inductive learning, Reinforcement Learning, learning decision trees, Neural Net learning and Genetic learning. Probabilistic Methods, Bayesian Theory, Dempster Shafer Theory, Bayes Network. 19 Evolutionary computations: Swarm Intelligence, ant colony optimization Agents, Intelligent Agents, Structure of Intelligent Agents, Virtual Agents, Multi-agent systems. Case Study: Health Care, E Commerce, Smart Cities.		

Total Lecture Hours 45 hours

Textbooks:

	Authors Name
1. Artificial Intelligence: A Modern Approach, Pearson Education, 4th Edition , 2021	Stuart Russell and Peter Norvig
2. Artificial Intelligence, McGraw-Hill, 3rd Edition , 2010	Elaine Rich and Kevin Knight
3. Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 3rd Edition , 2024	David L. Poole and Alan K. Mackworth

Reference Books:

	Authors Name
1. Artificial Intelligence, Pearson Education Inc., 3rd Edition , 1992	Patrick Henry Winston
2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th Edition , 2012	George F. Luger
3. Artificial Intelligence: A New Synthesis, Harcourt Asia Pvt. Ltd., 1st Edition , 1998	Nils J. Nilsson

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	01Hrs 05Min
Video Lectures	01Hrs 05Min 02Hrs 00Min 01Hrs 00Min 02Hrs 05Min
Web References	

Course Code: BMICA0512				Course Name: Fundamentals of Digital Marketing and Optimization				L	T	P	C
Course Offered in: MCA Integrated								3	0	0	3
Pre-requisite: Basic Marketing Concepts, Basic Knowledge of Computers.											
Course Objectives:											
To introduce students about digital and social media marketing techniques and decisions on digital platforms. 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.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Describe importance of digital marketing.							K2			
CO2	Reorganize how marketers use Google SEO projects to influence purchasing and selling decisions on digital platforms using digital content and tools.							K2			
CO3	Analyze the benefits of integrating traditional and digital marketing with Google SEO for sells and purchasing marketing strategies.							K3			
CO4	Evaluate the benefits of search advertising for a business that uses social media to target an audience.							K4			
CO5	Implement an active social media community by using social media advertising.							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	1	-	1	-	-	-	1		
CO2		2	2	3	3	1	1	-	1		
CO3		2	3	3	2	1	2	-	1		
CO4		2	3	2	3	1	2	-	1		
CO5		1	2	3	3	3	1	1	1		
Course Contents / Syllabus											
Unit 1			Introduction							09 hours	
Digital Consumer Behavior, The Digital Customer Journey, The Digital Opportunity, Digital and Your Organization, Business Growth and Digital Marketing Principles: Key Digital Marketing Concepts, Traditional and Digital Marketing, 3i Principles, Integrating Traditional and Digital Marketing, Tools for Digital Marketing.											
Unit 2			Content Marketing							09 hours	
Content Marketing, Content Types, Social Media Platforms, Content Creation Tools, Influencer Marketing, eBook and Whitepapers. Social Media : 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 Social Media Community.											
Unit 3			Social Media Strategy							09 hours	
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 : 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 4	Instagram And Snapchat Applications	09 hours
Video, stories, live, Instagram Posts, Snapchat Meanings, Snapchat Story, Basic Features Instagram Account Overview, Audience Development, Advertising Overview, 3V Advertising, Ads Manager, Snap Ads, Instagram Analysis, Snapchat Analysis, Campaign Setup, Snapchat Geofilters		
Unit 5	Twitter, LinkedIn And YouTube Applications	09 hours
Twitter Concepts, Platform Features, Profile Promotion and management, Hashtags, Analysis and Reporting. 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.		
Total Lecture Hours		45 hours
Textbooks:		
		Authors Name
1. Digital Marketing For Dummies, John Wiley & Sons, Inc., 1st Edition , 2021		Ryan Deiss and Russ Henneberry
2. Youtility: Why Smart Marketing Is About Help, Not Hype, Gildan Media, LLC, 1st Edition , 2013		Jay Baer
3. Digital Marketing: Strategy, Implementation and Practice, Pearson Education, 8th Edition , 2022		Dave Chaffey and Fiona Ellis-Chadwick
Reference Books:		
		Authors Name
1. Digital Marketing: Strategy, Implementation and Practice, Pearson Publication, 7th Edition , 2021		Dave Chaffey and Fiona Ellis-Chadwick
2. Digital Marketing: Integrating Strategy and Tactics with Values, Routledge, 2nd Edition , 2022		Ira Kaufman, Chris Horton, and Rajan Sambandam
3. Digital Marketing Excellence: Planning, Optimizing and Integrating Online Marketing, Routledge, 6th Edition , 2019		Dave Chaffey and P. R. Smith
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	01Hrs 05Min
Video Lectures	https://www.youtube.com/results?search_query=Google+Digital+Garage+Fundamentals+of+Digital+Marketing	01Hrs 05Min
	https://www.youtube.com/results?search_query=Simplilearn+Digital+Marketing+Full+Course	02Hrs 00Min
	https://www.youtube.com/results?search_query=WsCube+Tech+Digital+Marketing+Complete+Course	01Hrs 00Min
	https://www.youtube.com/results?search_query=Great+Learning+Digital+Marketing+Course	02Hrs 00Min
	https://www.youtube.com/results?search_query=Great+Learning+Digital+Marketing+Course	
Web References	https://learndigital.withgoogle.com/digitalgarage https://academy.hubspot.com/courses/digital-marketing https://skillshop.withgoogle.com/ https://moz.com/beginners-guide-to-seo	

Course Code: BMICA0513			Course Name: CRM Fundamentals				L	T	P	C
Course Offered in: MCA Integrated							3	0	0	3
Pre-requisite: Basic knowledge of computer, marketing concepts and good communication skills .										
Course Objectives:										
This course is designed to help in understanding the fundamentals of CRM which will help in providing better services for Sales, Marketing and Customer Relations in an Enterprise.										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Discuss the basic concepts of customer relationship management						K2			
CO2	Recognize strategy and framework of customer relationship management.						K2			
CO3	Acquire basics of cloud-based customer relationship management.						K3			
CO4	Illustrate customer relationship management in context with business usecases.						K3			
CO5	Implement basics of CRM.						K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	1	-	-	1	-	-	1		
CO2	2	2	2	1	2	1	-	1		
CO3	2	2	2	3	1	1	-	1		
CO4	2	3	2	2	2	2	-	1		
CO5	2	2	3	3	2	1	1	1		
Course Contents / Syllabus										
Unit 1		Introduction							09 hours	
Definition, history, goals. Sources of CRM value. Components of CRM: people, process, technology. Marketing and its principles, customer relations to CRM. Dynamics of Customer Supplier Relationships, Nature and context of CRM, Strategy The relationship-oriented organization: Mission, Culture, Structure, People, Communication & Information Systems										
Unit 2		CRM Strategy and Framework							09 hours	
Developing a CRM strategy. Customer oriented (C in CRM), Relationship driven, 360-degree view of customer. CRM system features-functions, application, benefits and solutions. Importance of loyalty-active, passive, split, shifting and switchers, customer profiling, customer segmentation model, Customer Experience, relationship marketing and journey, Case study.										
Unit 3		Solution Design and Architecture							09 hours	
Data Analysis, Solution Requirements. Types of CRM- On-Premise, cloud based. Pros and Cons of each. Integration CRM with other enterprise applications. Data warehouses and customer relationships, creating data mart model, components of operational data warehouse.										
Unit 4		CRM for Business							09 hours	
CRM in Sales, Service, Marketing, E-commerce. Social Customer Relationship Management. Analytical CRM: Predictive Analytics Vs Operational Analytics. Channel Partner Relationship management, Collaborative CRM (using data pooling), Business Benefits of Cloud Based System, SLAs, Practical Challenges.										



Unit 5	CRM Implementation	09 hours
Current processes, customers, strategic goals, technology issues, pilotand proof of concept projects. Preliminary Roadmap and its template, developing roadmap midstream. Design stage, custom development, integration, reporting, data migration, and implementation, testing, launching and application management.ZOHO, Pega, Microsoft Dynamics 365, Sales force.		
Total Lecture Hours		45 hours
Textbooks:		
		Authors Name
1.Customer Relationship Management: Concepts and Technologies, Routledge, 4th Edition, 2022		Francis Buttle and Stan Maklan
2. Customer Relationship Management: Concept, Strategy, and Tools, Springer, 3rd Edition, 2018		V. Kumar and Werner Reinartz
3. CRM Fundamentals, Apress, 1st Edition, 2011		Scott Kostojohn, Mathew Johnson, and Brian Paulen
Reference Books:		
		Authors Name
1.CRM at the Speed of Light: Social CRM Strategies, Tools, and Techniques, McGraw-Hill Education, 4th Edition, 2017		Paul Greenberg
2. The CRM Handbook: A Business Guide to Customer Relationship Management, Addison-Wesley Professional, 1st Edition, 2002		Jill Dyche
3. Strategic Customer Management: Integrating Relationship Marketing and CRM, Cambridge University Press, 1st Edition, 2013		Adrian Payne and Pennie Frow
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	09Hrs 00Min
Video Lectures	https://nptel.ac.in/ https://swayam.gov.in/ https://academy.hubspot.com/courses/crm https://trailhead.salesforce.com/	08Hrs 00Min 04Hrs 30Min 03Hrs 15Min 12Hrs 00Min
Web References	https://www.hubspot.com/crm https://www.salesforce.com/crm https://learn.microsoft.com/dynamics365 https://www.oracle.com/cx	



LAB Course Code: BMICA0551				LAB Course Name: Design and Analysis of Algorithms Lab				L	T	P	C
Course Offered in: MCA Integrated								0	0	4	2
Pre-requisite: Basic knowledge of programming, data structures, and problem-solving is required to understand and implement algorithm design and analysis techniques in the Design and Analysis of Algorithms Lab.											
Course Objectives:											
Analyze asymptotic performance of algorithms designed using different computational model. Study advanced data structures like Red black Tree, binomial and Fibonacci heap and learn theconcept of complexity classes											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Describe & illustrate algorithm to solve problems by iterative approach.							K3			
CO2	Implement & illustrate algorithm to solve problems by divide and conquer approach.							K2			
CO3	Determine & develop algorithm to solve problems by Greedy algorithm approach.							K5			
CO4	Illustrate algorithm to solve problems by Dynamic programming, branchand bound approach.							K3			
CO5	Apply & analyze algorithm to solve problems by backtracking approach.							K4			
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	1	-	-	-	1		
CO2		3	3	2	2	-	-	-	1		
CO3		2	3	3	2	-	-	-	1		
CO4		2	3	3	2	-	-	-	1		
CO5		2	3	2	2	-	-	-	1		
Sr. No	Program Title									CO Mapping	
1	Write an Algorithm / Program for the following: a) Leap Year Check b) Prime Number Check c) Generate a Fibonacci Series d) Factorial of a Number e) Check Number is a palindrome or not f) Find GCD g) Number is an Armstrong Number or Not Two strings are Anagram Strings or not.									CO1	
2	Program for Recursive and Non Recursive for Binary & Linear Search.									CO2	
3	Program for Selection, Bubble and Count Sort.									CO2	
4	Program for Merge Sort.									CO2	
5	Program for Insertion Sort.									CO2	
6	Program for Quick Sort.									CO2	
7	Program for Heap Sort.									CO2	
8	Program to implement Knapsack Problem using Greedy Solution.									CO3	
9	Program for 0/1 knapsack.									CO4	
10	Program for LCS (Longest Common Subsequence).									CO4	
11	Program for BFS and DFS.									CO5	
12	Program to implement Dijkstra's Algorithm.									CO5	



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13	Program to find Minimum Spanning Tree using Kruskal's Algorithm.	CO5
14	Program to implement N Queen Problem using Backtracking.	CO5
15	Program for traversing a tree.	CO5
		Total Hours: 30 hrs.



LAB Course Code: BMICA0552			LAB Course Name: Web Technology Lab					L	T	P	C
Course Offered in: MCA Integrated								0	0	4	2
Pre-requisite: Basic knowledge of Computer Fundamentals, Java Programming, HTML, Database Management Systems (DBMS), and Internet technologies.											
Course Objectives:											
Design static and dynamic web pages using HTML and CSS, implementing client-side script programming using JavaScript. Learn how to connect database using JDBC with Project development. Learn Servlet API development and JSP application design.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Describe the concept of web designing and publishing website							K2			
CO2	Apply and design web pages using HTML and CSS							K5			
CO3	Implement JavaScript code to add interactivity and dynamic behavior to webpages.							K3			
CO4	Apply database connectivity using Java Database Connectivity (JDBC)							K3			
CO5	Create dynamic web pages using JSP										
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	1	-	1	-	-	-	1		
CO2		2	2	3	2	-	-	-	1		
CO3		2	2	3	3	-	-	-	1		
CO4		2	3	2	3	-	1	-	1		
CO5		2	3	3	3	1	1	-	1		
Sr. No	Program Title								CO Mapping		
1	Write a program for different formatting tags used in HTML.								CO2		
2	Write a program for different types of list.								CO2		
3	Write a program for printing class time table showing use of rowspan and colspan.								CO2		
4	Program to show the use of target attribute with different values.								CO2		
5	Write a program to create a web page using image as hyperlink.								CO2		
6	Write a program to set a background image.								CO2		
7	Write a program to create a web page showing the use of font and text attribute of CSS.								CO2		
8	Write a program to create a web page showing the use of color and background attribute of CSS.								CO2		
9	Write html code to develop a webpage having two frames that divide the webpage into two equal rows.								CO2		
10	Write a program to create a web page showing the use of inline, internal and External CSS.								CO2		
11	Write a program to create a web page showing the use of implementation of BOX model in CSS.								CO2		
12	Write a program to create a web page showing the use of CSS positioning.								CO2		
13	Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied.								CO2		



14	Write a JavaScript Program to Print Hello World.	CO3
15	Write a JavaScript Program to Add Two Numbers	CO3
16	Write a JavaScript Program to Find the Square Root	CO3
17	Write a JavaScript Program to Calculate the Area of a Triangle	CO3
18	Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript	CO3
19	Write a JavaScript Program to Swap Two Variables	CO3
20	Write a JavaScript Program to Convert Celsius to Fahrenheit	CO3
21	Write a JavaScript Program to Convert Decimal to Binary	CO3
22	Write a JavaScript Program to Check if a number is Positive, Negative.	CO3
23	JavaScript Program to Find the Factorial of a Number	CO3
24	JavaScript Program to Check Prime Number	CO3
25	JavaScript Program to Display the Multiplication Table	CO3
26	JavaScript Program to Print the Fibonacci Sequence	CO3
27	JavaScript Program to Check Armstrong Number	CO3
28	JavaScript Program to Find the Sum of Natural Numbers	CO3
29	Write a JavaScript code to enter week day number and print day name.	CO3
30	Write a program for implementation of statement in JDBC	CO4
31	Write a program Transaction management using statement.	CO4
32	Write a program to Import JDBC packages	CO4
33	Write a program to Register JDBC Driver	CO4
34	Write a program to Open and Close a connection using JDBC	CO4
35	Write a program to Extract data from above created student table.	CO4
36	Write a basic Servlet program that prints "Hello, World!" on the web page.	CO5
37	Write a Program to create simple servlet that just generates plain text.	CO5
38	Write a Servlet program displays the current date and time.	CO5
39	Write a servlet program to demonstrate Http Servlet.	CO5
40	A Servlet program that demonstrates session management by storing user data in a session.	CO5
Total Hours: 30 hrs.		

LAB Course Code: BMICA0553			LAB Course Name: Software Testing and Application Lab				L	T	P	C
Course Offered in: MCA Integrated							0	0	4	2
Pre-requisite: Basic knowledge of Programming, Software Engineering, Database Management Systems (DBMS), Web Technologies, and Software Development Life Cycle (SDLC).										
Course Objectives:										
To equip students with practical skills in testing methodology, tools and techniques, to develop expertise in test case design, execution, automation, defect tracking and performance testing for robust software development										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Design and execute effective test cases for various programming constructs and application functionalities.							K6		
CO2	Identify, analyze, and document potential causes of failures in software applications, such as matrix multiplication.							K4		
CO3	Prepare testing user interfaces and performance metrics for web applications, particularly focusing on registration and login pages.							K5		
CO4	Apply security testing techniques to ensure the robustness of web applications against potential vulnerabilities.							K3		
CO5	Develop the ability to write detailed system specifications, identify bugs, and create test cases for complex systems like ATM and banking applications.							K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	2	3	3	2	-	-	-	1		
CO2	2	3	2	2	-	-	-	1		
CO3	2	2	3	3	1	1	-	1		
CO4	2	3	2	3	-	-	3	1		
CO5	2	3	3	2	1	1	2	1		
Sr. No	Program Title									CO1
1	Write the Test cases for programs in any language which demonstrate the working of the following constructs i) do.While ii) while iii) if...else iv) switch v) for.									CO1
2	Write down the possible reasons for failure of Matrix multiplication.									CO1
3	Write the Test cases based on UI of Registration Page in Online Banking System.									CO2
4	Write the Test cases based on Terms and Conditions field of Registration Page.									CO2
5	Write the Test cases based on Performance in Registration Page.									CO2
6	Write the Test cases for Functionality in Registration Page.									CO3
7	Write the Test cases based on Security in Registration Page.									CO3
8	Write the Test cases for Functionality in Login Page.									CO3
9	Write the Test cases based on UI in Login Page.									CO4
10	Write the Test cases based on Performance in Login Page.									CO4
11	Write the Test cases based on Security in Login Page.									CO4
12	Write system specifications for ATM and make report on various bugs.									CO5
13	Write the test cases for banking application in respect of Registration Page and Login Page.									CO5
Total Hours: 30 hrs.										



Course Code: BMICANC0501/ BMICANC0502				Course Name: Constitution of India, Law and Engineering* / Essence of Indian Traditional Knowledge				L	T	P	C
Course Offered in: MCA Integrated								2	0	0	0
Pre-requisite: Basic Understanding of the Indian Constitution.											
Course Objectives:											
To acquaint the students with legacies of constitutional development in India and help them to understand the most diversified legal document of India and philosophy behind it.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Identify and explore the basic features and modalities about Indian constitution.							K1			
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.							K2			
CO3	Differentiate different aspects of Indian Legal System and its related bodies.							K4			
CO4	Discover and apply different laws and regulations related to engineering practices.							K4			
CO5	Correlate role of engineers with different organizations and governance models							K4			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	1	-	-	-	-	2	1			
CO2	2	2	-	-	1	1	2	1			
CO3	2	3	-	-	1	1	3	1			
CO4	2	2	1	1	1	1	3	1			
CO5	1	2	2	1	2	2	3	1			
Course Contents / Syllabus											
Unit 1		Introduction And Basic Information About Indian Constitution								07 hours	
Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947, Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.											
Unit 2		Union Executive And State Executive								05 hours	
Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of VicePresident, Powers and Functions of the Prime Minister. The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013 Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.											
Unit 3		Introducti on And Basic Informatio n About Legal System								05 hours	



Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court).

As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

Unit 4	Intellectual Property Laws And Regulation To Information	06 hours
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Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

Unit 5	Business Organizations And E-Governance	07 hours
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Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

Total Lecture Hours	30 hours
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Textbooks:

	Authors Name
1.Introduction to the Constitution of India, LexisNexis, 26th Edition , 2021	Durga Das Basu
2.Engineering Ethics and Human Values, McGraw Hill Education, 2nd Edition , 2019	M. Govindarajan, S. Natarajan and V. S. Senthil Kumar
3.Essence of Indian Traditional Knowledge, Khanna Book Publishing, 1st Edition , 2021	Mahesh Verma and Vandana Sharma

Reference Books:

	Authors Name
1.The Indian Constitution, Oxford University Press, 1st Edition , 2012	Madhav Khosla
2.The Constitution of India, Universal Law Publishing, Latest Edition	P. M. Bakshi
3.Law Relating to Intellectual Property Rights, LexisNexis Butterworths Wadhwa, 2nd Edition , 2007	V. K. Ahuja

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	1Hrs 00Min
Video Lectures	08Hrs 30Min 12Hrs 00Min 06Hrs 30Min 10Hrs 15Min
Web References	

<https://nptel.ac.in/courses>

<https://nptel.ac.in/courses>
<https://swayam.gov.in/>
<https://fdp-si.aicte-india.org/>
<https://nptel.ac.in/>

<https://legislative.gov.in/constitution-of-india/>
<https://www.india.gov.in/>
<https://www.aicte-india.org/>
<https://iksindia.org/>



Course Code: BMICA0601			Course Name: Advance Java				L	T	P	C
Course Offered in: MCA Integrated							3	1	0	4
Pre-requisite: Basics of Programming Concepts and Core JAVA, Database-SQL, JavaScript, HTML, CSS.										
Course Objectives:										
Objective of this course is to provide the ability to design console based, GUIbased, web based applications, Integrated development environment to create, debug and run multi-tier and enterprise-level applications.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Illustrate, Analyze, and Build dynamic web pages for server-sideprogramming.							K4		
CO2	Implement the connection between Java andDatabase using JDBC.							K3		
CO3	Analyze and design the Spring Core Modules and DI to configure and wirebeans (application objects) together.							K5		
CO4	Design Model View Controller architecture and ready components that can beused to develop flexible and loosely coupled web applications.							K5		
CO5	Analyze and Design React components using JavaScript functions.							K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	1	-	-	-	-	1	1		
CO2	2	2	2	1	1	3	1	1		
CO3	3	3	-	-	1	1	3	1		
CO4	2	2	1	1	1	1	3	1		
CO5	1	2	2	1	2	2	3	1		
Course Contents / Syllabus										
Unit 1		Introduction: Servlets and JSP							10 hours	
Applet Basics, Life Cycle of an Applet in Java, Flow of Java Applet Life Cycle, The Applet Class, Invoking an Applet, Getting Applet Parameters, Application Conversion to Applets, Event Handling. Displaying Images. Setting up for JSP and Servlets, Hello Servlets, Servlets lifecycle, Hello JSP, JSP scripting elements, JSP Declarations element, JSP Comments, Deployment descriptor and annotations Reading URL parameter(s) in Servlets, Include file(s) in JSP page, How to create Maven project in Eclipse, Import class in JSP file, Forward and Redirect in JSP, A simple JSP exercise, Forms overview, Forms under JSP, Forms under Servlets.										
Unit 2		Java Beans, JSP, Database, Hibernate							15 hours	
Java beans scopes - Session and application, Java beans scopes - page and request Java beans with forms, Session in JSP – introduction, Introduction to cookies, Read and Write Operation of Cookie in JSP and Servlets, User logout using cookie, User logout using session, Organizing the application, Adding redirects and forwards, About web templates, Integrate template with project. Setting up the controller, Database connection setup, Displaying data from database, Adding database operations in Model, Add user form, Add user operation, Update user operation, Delete user operation, Setting up eclipse project for hibernate, Setting hibernate configuration file, About Hibernate sessions, Setting hibernate entity, class, Hibernate CURD operation – Create, Hibernate CURD operation – Read, Hibernate CURD operation – Update, Hibernate CURD operation – Delete, Hibernate HQL operation – Listing, Hibernate HQL operation - Where clause, Hibernate HQL operation – update, HQL - Delete and wrap up, Debugging in Eclipse.										
Unit 3		Spring 5.0							15 hours	



Setting things up) Setting the IDE, Dependency injection getting started, Dependency injection continues, Inversion of control, Auto wire introduction, Auto wire scenarios, Qualifier annotation, Spring beans, Constructor injection, Spring MVC minimal project, Introduction To Web Services, Resource based URIs, Rest response, Status codes, Idempotence of HTTP Methods, Hypermedia as the Engine of Application State (HATEOAS) The Richardson Maturity Model. Setting up for Spring boot, Spring Starter project, Spring Web MVC starter project, The template and external files, Adding Fragments, header, footers to web pages Finalizing the template for the application, Updating application properties, Adding Models in Spring Boot. Adding repository and service classes in Spring Boot, Adding seed, data in the database, Displaying data on webpage, Spring Boot, Adding Account models in Spring Boot, Updating the seed data, Adding register account form, Adding login user form, Adding Spring security into the application, Spring security login, adding rules and B crypt password, Spring security login, override load User By Username, Update the Web template with Thyme leaf tags

Unit 4	Spring Boot	10 hours
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Role and Authorities, Adding Roles to user account, Add Authorities to User Account in Spring boot, Add users with Roles and Authorities, Add users with Roles and Authorities continues, Application has bugs Add security rules for Roles and Authorities, Update homepage, for post links, Get Post from Spring Boot Application, View a post with edit options. Add post in Spring Boot application Add WYSIWYG text Editor in the Add post page, Handle post add in Spring Boot Blog application, Add edit post form in Spring Boot Blog application, Handle edit post in Spring Boot Blog application, Delete post in Spring Boot Blog application, Add warning model for Delete operation

Upgrading the registration form in Spring boot, Adding Profile page on the Blog application, Update Profile (Account) on the Spring, Boot Blog, Update Profile Photo on the Spring Boot Blog, Remember me, Add forgot password view, Handle reset password and token generation, Sending email for password reset, Sending email for password reset continues, Email Service , Spring Boot, Password change in Spring boot, Reset password Spring Boot. Adding Pagination and Sorting option on homepage, Pagination and Sorting in Spring boot.

Unit 5	React	10 hours
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Setting up React JS, Getting started with React, Downloading the template, Understanding the template, Making changes in the template, Dark mode on Google Chrome, Making HTTP GET call with axios, Local server, CORS and Proxy, The login page with react JavaScript, Login, token handling and local storage, Token validation and redirections, Dynamic menus and updated registration page, Logout and about page Logout and about page continues, Section wrap-up, Add albums, Album tiles on homepage, Upload photos onto the Albums, Upload photos form, Upload photos processing animation, Props, use Effect and Async, Albums Show page, Albums Show page, Network calls, Add album and photo actions, Edit album and photo action, Edit album and photo action continues, Delete actions, Download photo action, View Photo.

Total Lecture Hours 60 hours

Textbooks:

	Authors Name
1.Java for Web Development, BPB Publications, 2022	Sarika Agarwal and Vivek
2.Servlet & JSP: A Tutorial, Brainy Software, 2016	Budi Kurniawan
3.Core Servlets and JavaServer Pages, 2nd Edition, Prentice Hall, 2003	Marty Hall and Larry Brown

Reference Books:

	Authors Name
1.Head First Servlets and JSP, 2nd Edition, O'Reilly Media, 2008	Bryan Basham, Kathy Sierra and Bert Bates
2.Murach's Java Servlets and JSP, 3rd Edition, Murach Books, 2014	Joel Murach and Michael Urban
3.Java: The Complete Reference, 13th Edition, McGraw Hill, 2022	Herbert Schildt



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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)



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MBA/MCA



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Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	10Hrs 00Min
Video Lectures	https://nptel.ac.in/courses https://onlinecourses.nptel.ac.in/ https://www.youtube.com/@JavaBrainsChannel https://www.youtube.com/@Telusko	40Hrs 00Min 36Hrs 00Min 09Hrs 30Min 11Hrs 00Min
Web References	https://docs.oracle.com/en/java/ https://jakarta.ee/ https://tomcat.apache.org/ https://www.javatpoint.com/servlet-tutorial	



Course Code: BMICA0602			Course Name: Computer Graphics and Multimedia				L	T	P	C
Course Offered in: MCA Integrated							4	0	0	4
Pre-requisite: Knowledge of Computer, Mathematics and algorithm is preferable										
Course Objectives:										
Understanding Basic Concepts and fundamental concepts of computer graphics, including rendering, geometric transformations, and image processing. Introduce students to graphics software and libraries commonly used for developing graphics applications, and provide experience with programming graphics applications.										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Analyze various Generating Algorithms, attributes associated with output primitives and Area Filling Algorithms.						K4			
CO2	Apply the concepts of parallel and perspective projections with proficient inline clipping.						K3			
CO3	Develop 3-D transformations on objects and various algorithms for visible surface detection.						K5			
CO4	Create, implement and control animations using computer-based methods.						K5			
CO5	Explore basic and advanced compression 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	-	-	1	-	1	1		
CO2	3	3	3	2	2	1	1	1		
CO3	3	3	2	2	3	1	2	1		
CO4	3	3	3	2	2	2	2	1		
CO5	3	3	2	3	3	2	2	2		
Course Contents / Syllabus										
Unit 1		Introduction							15 hours	
Concepts and applications, Interactive Graphics, Random and Raster scan devices, Refresh Cathode ray tubes, LCD monitors, Laser, Printers, Keyboards, Mouse, Scanners. Line drawing algorithm: DDA along with Bresenhan's. Circle generating algorithm, Midpoint algorithms: ellipse and other curves. Attributes of output primitive, Antialiasing. Filled area primitive: Scan-line Polygon fill Algorithm, boundary fill algorithm, flood fill algorithm.										
Unit 2		Two-Dimension al Graphics Transformations							09 hours	
Two-dimensional Transformations: Translation, scaling, rotation, reflection, shear, matrix representation of all homogeneous coordinates, composite transformation. parallel and perspective projection. Two-dimensional viewing, Viewing pipeline Window-to-view port transformation. Clipping operations. Line Clipping: Cohen Sutherland, Nicholl-lee-Nichol land Liangbarsky, Polygon Clipping.										
Unit 3		Three-Dimensional Graphics Transformations							12 hours	
Three-dimensional object representations: Polygon Surface, Tables, Plane Equation. Curved lines and Surfaces: Spline representation, Interpolating and approximation curves, continuity conditions Cubic Splines, Bezier curves B- Spline curves: characteristics and generation, 3-D Transformation. Object based and image based methods, depth comparison, A-Buffer, Back face removal, Scan-line method, Depth Sorting Method Area subdivision method.										
Unit 4		Introduction to Multimedia and Animation							12 hours	



Devices, messages, software. Speech, Video and Animation: Basic concept, computer-based animation, methods of controlling animation, display of animation, and transmission of animation.

Unit 5	Data Compression Techniques	12 hours

storage space, coding requirements. Source, entropy and hybrid coding runlength code, Huffman code. JPEG: Image preparation, Lossy sequential DCT – based mode, expanded lossy DCT based mode, Lossless mode, Hierarchical mode. MPEG, Huffman Encoding, LZW compression.

Total Lecture Hours		60 hours
Textbooks:		
		Authors Name
1.Computer Graphics, Pearson Publication, 2nd Edition , 2014		Donald Hearn and M. Pauline Baker
2. Multimedia Computing, Communications & Applications, Pearson Publication, 1st Edition , 2017		Ralf Steinmetz and Klara Nahrstedt
3. Computer Graphics with OpenGL, Pearson Education, 4th Edition , 2014		Donald Hearn, M. Pauline Baker and Warren Carithers
Reference Books:		
		Authors Name
1.Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL, Addison-Wesley, 6th Edition , 2013		Edward Angel and Dave Shreiner
2. Fundamentals of Computer Graphics, CRC Press, 5th Edition , 2021		Peter Shirley, Michael Ashikhmin and Steve Marschner
3. Computer Graphics: Principles and Practice, Addison-Wesley, 3rd Edition , 2013		John F. Hughes, Andries van Dam, Morgan McGuire, David F. Sklar.
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	10Hrs 00Min
Video Lectures	https://onlinecourses.nptel.ac.in/noc20_cs90/preview https://nptel.ac.in/courses https://www.cse.iitm.ac.in/~vplab/computer_graphics.html https://nptel.ac.in/courses/106102065	30Hrs 00Min 36Hrs 00Min 32Hrs 00Min 25Hrs 00Min
Web References	https://nptel.ac.in/courses https://swayam.gov.in https://www.khronos.org/opengl/	

Course Code: BMICA0603			Course Name: Computer Networks				L	T	P	C
Course Offered in: MCA Integrated			3	1	0	4				
Pre-requisite: Basic computer concepts and terminology										
Course Objectives:										
To develop understanding of concepts, principles, and technologies related to networking. To enhance their knowledge and skills in designing, implementing and managing network infrastructure. To establish a strong foundation for a career in the field of networking.										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Identification of Network fundamentals.						K2			
CO2	Classify Various IP addressing techniques.						K2			
CO3	Implement, and verify IP routing technologies.						K3			
CO4	Identify and configure LAN switching technologies.						K2			
CO5	Explore about network management methods and tools for monitoring and troubleshooting.						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	-	1	-	1	1	1		
CO2	3	3	2	2	1	1	1	1		
CO3	3	3	3	3	1	2	1	1		
CO4	2	3	2	3	2	2	2	1		
CO5	3	3	3	3	2	2	3	2		
Course Contents / Syllabus										
Unit 1		Network Fundamentals							15 hours	
Basic network concepts, Network architecture and topologies, OSI and TCP/IP models, Physical Layer: Cabling and network devices, Ethernet standards and technologies, Data Link Layer: MAC addressing and ARP, VLANs and trunking, Network Layer: IP addressing and subnetting, IPv4 vs. IPv6, Routing basics and protocols (e.g., RIP, EIGRP, OSPF), Transport Layer: TCP and UDP operations, Port numbers and sockets, Application Layer: Common network services and protocols (e.g., HTTP, FTP, DNS)										
Unit 2		Network Access and IP Connectivity							10 hours	
Switch operations and configuration, Spanning Tree Protocol (STP), EtherChannel and link aggregation Static and dynamic routing, Routing tables and protocols, Inter, VLAN routing DHCP and NAT, NTP and Syslog Access control lists (ACLs), Secure access to devices.										
Unit 3		Security Fundamentals and Automation							15 hours	
Security threats and vulnerabilities, Mitigation techniques and best practices. Secure device management Implementing device hardening, Firewall technologies and types, Intrusion Prevention Systems (IPS). Introduction to network automation, Configuration management tools (e.g., Ansible, Puppet), Basics of network programmability and SDN										
Unit 4		Advanced Routing and Switching							10 hours	
Advanced STP features, Multilayer switching, QoS concepts, Advanced OSPF configurations, BGP fundamentals and configuration, Route redistribution and filtering, MPLS and VPNs, WAN topologies and protocols (e.g., GRE, DMVPN)										
Unit 5		Network Design and Troubleshooting							10 hours	
Hierarchical network design,										



Enterprise network architecture, High availability and redundancy, Troubleshooting methodologies and tools, Common network issues and resolutions, Case studies and real-world scenarios, Wireless technologies and standards, Wireless LAN configuration and management, Wireless security protocols, IoT and cloud networking, Network virtualization

Total Lecture Hours | **60 hours**

Textbooks:

	Authors Name
1.Computer Networks, Standard Edition, McGraw Hill, 2023	Behrouz A. Forouzan
2.Computer Networks, 6th Edition, Pearson Education India, 2022	Andrew S. Tanenbaum
3.Computer Networks: A Systems Approach, 5th Edition, Elsevier, 2011	Larry L. Peterson and Bruce S. Davie

Reference Books:

	Authors Name
1.Data and Computer Communications, 11th Edition, Pearson, 2019	William Stallings
2.Computer Networking: A Top-Down Approach, 8th Edition, Pearson, 2021	James F. Kurose and Keith W. Ross
3.TCP/IP Illustrated, Volume 1: The Protocols, 2nd Edition, Addison-Wesley, 2011	W. Richard Stevens and Kevin R. Fall

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	5Hrs00Min
Video Lectures	https://nptel.ac.in/courses https://nptel.ac.in/courses https://swayam.gov.in/ https://www.netacad.com/courses/networking-basics	32Hrs00Min 30Hrs00Min 28Hrs00Min 22Hrs00Min
Web References	https://nptel.ac.in/ https://www.netacad.com/ https://developer.cisco.com/	

Course Code: BMICA0604			Course Name: Distributed System			L	T	P	C
Course Offered in: MCA Integrated						4	0	0	4
Pre-requisite: Basic knowledge of Data Structures and Algorithms, Basic networking concepts, and Basic OS concepts.									
Course Objectives:									
To have a broad and up-to-date coverage of the principles and practice in Distributed Systems. To understand the heterogeneous systems such as computers, mobile phones, other devices, and Internet) and their functionalities.									
Course Outcome: After completion of the course, the student will be able to						Bloom's Knowledge Level (KL)			
CO1	Compare and contrast different architectural models such as client-server, peer-to-peer, and three-tier architectures.					K4			
CO2	Implement and manage remote object interactions using RMI or similar technologies.					K4			
CO3	Develop distributed applications using middleware solutions.					K5			
CO4	Apply event-driven programming for asynchronous communication.					K3			
CO5	Implement clock synchronization algorithms.					K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	1	-	-	1	-	1	1	
CO2	3	2	2	2	1	1	1	1	
CO3	3	3	3	2	2	1	2	1	
CO4	2	3	2	3	2	1	2	1	
CO5	3	3	3	3	2	2	2	2	
Course Contents / Syllabus									
Unit 1		Basic Concepts						15 hours	
Definition of a distributed systems, Examples, Resource sharing and the Web, Challenges, System models, Architectural and fundamental models, Networking Inter process communication, External data representation and marshalling, Client-server and Group communication.									
Unit 2		Distributed Objects and Process						09 hours	
Distributed objects and remote invocation, Communication between distributed objects, Remote procedure call, Events and notifications - The operating system layer, Protection, Processes and Threads, Communication and invocation, OS Architecture. Security techniques, Cryptographic algorithms, Access control, Digital signatures, Cryptography pragmatics, Needham-Schroeder, Kerberos, Securing electronics transaction, IEEE 802.11 WiFi.									
Unit 3		Operating System Issues						12 hours	
Distributed file systems - Name services, Domain name system, Directory and discovery services, Peer to peer systems, Napster file sharing system, Peer to peer middleware routing overlays – Clocks, Events and process states Clock Synchronization - Logical clocks Global states - Distributed debugging - Distributed mutual exclusion - Elections - Multicast communication.									
Unit 4		Distributed Transaction Processing						12 hours	
Transactions - Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering									



- Flat and nested distributed transactions - Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery - Overview of replication, Distributed shared memory and Web services.

Unit 5 **Distributed Algorithms** **12 hours**

Synchronous network model - Algorithms: leader election, maximal independent set.
Asynchronous system model : I/O automata, operations on automata, fairness – Asynchronous shared memory model - Mutual exclusion: model, the problem, stronger conditions, lockout-free mutual exclusion algorithms, lower bound on the number of registers – Asynchronous network model - Asynchronous network algorithms: leader election in a ring and an arbitrary network.

Total Lecture Hours **60 hours**

Textbooks:

	Authors Name
1.Distributed Systems: Concepts and Design, 5th Edition, Pearson Education, 2017	George Coulouris, Jean Dollimore
2. Distributed Systems: Principles and Paradigms, 2nd Edition, Pearson Education, 2015	Andrew S. Tanenbaum and Maarten van Steen
3. Distributed Systems, 3rd Edition, CreateSpace Independent Publishing Platform, 2017	Maarten van Steen and Andrew S. Tanenbaum

Reference Books:

	Authors Name
1.Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2012	Ajay D. Kshemkalyani and Mukesh Singhal
2. Distributed Algorithms, Morgan Kaufmann Publishers, 1996	Nancy A. Lynch
3. Distributed Systems for Fun and Profit, 1st Edition, 2014	Mikito Takada

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	10Hrs00Min
Video Lectures	30Hrs00Min 28Hrs30Min 24Hrs00Min 20Hrs00Min
Web References	

<https://nptel.ac.in/courses>

<https://nptel.ac.in/courses>

<https://onlinecourses.nptel.ac.in/>

<https://ocw.mit.edu/>

<https://www.cl.cam.ac.uk/teaching/>

<https://nptel.ac.in/>

<https://swayam.gov.in/>

<https://www.cl.cam.ac.uk/teaching/>

<https://www.geeksforgeeks.org/distributed-systems/>



Course Code: BMICA0611Z				Course Name: Machine Learning				L	T	P	C
Course Offered in: MCA Integrated								3	0	0	3
Pre-requisite: Programming Proficiency, Mathematics Fundamentals, Data Structures and Algorithms.											
Course Objectives:											
Understand the basic principal of Machine Learning and importance of Supervised Learning, Unsupervised Learning & Familiarize with concepts of clustering.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Describe the fundamental concepts and terminologies of machine learning.							K2			
CO2	Evaluate and compare supervised learning models using appropriateevaluation metrics.							K4			
CO3	Implement dimensionality reduction techniques to visualize high-dimensionaldata and extract important features.							K3			
CO4	Apply feature engineering techniques to preprocess raw data and improvemodel accuracy.							K3			
CO5	Analyze and solving the results of machine learning models in the context ofethical considerations and societal impact.							K4			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	1	-	-	1	-	2	1		
CO2		2	2	-	1	1	1	2	1		
CO3		2	3	2	-	1	1	3	1		
CO4		2	2	1	1	1	1	1	2		
CO5		3	2	2	1	2	2	3	1		
Course Contents / Syllabus											
Unit 1		Introduction to ML								09 hours	
Definition of machine learning, Historical development and milestones, Applications of machine learning in various fields, Supervised learning, Unsupervised learning, Semi-supervised learning, Reinforcement learning, Other paradigms (e.g., self-supervised learning, transfer learning), Basic Concepts and Terminology Features, labels, and examples Training data, validation data, Loss functions and optimization algorithms											
Unit 2		Supervised Learning								09 hours	
Linear regression, Polynomial regression, Regularization techniques (L1, L2 regularization), Evaluation metrics (e.g., mean squared error, R-squared) .Binary classification, Multi-class classification , Logistic regression, Decision trees, Support Vector Machines (SVM), Evaluation metrics (e.g., accuracy, precision, recall, F1- score)											
Unit 3		Unsupervised Learning								09 hours	
K-means clustering, Hierarchical clustering, Density-based clustering (e.g., DBSCAN), Evaluation metrics (e.g., silhouette score).Principal Component Analysis (PCA), t-Distributed Stochastic Neighbor Embedding (t-SNE), Autoencoders, Applications and interpretation of dimensionality reduction techniques.											
Unit 4		Advanced Techniques in Machine Learning								09 hours	



Bagging (e.g., Random Forest), Boosting (e.g., AdaBoost, Gradient Boosting), Stacking Feature Engineering: Techniques for creating new features from raw data, Feature scaling and normalization, Handling missing data. Cross-validation, Bias-variance tradeoff, Model selection techniques (e.g., grid search, random search), Model interpretability and visualization

Unit 5	Applications and Case Studies	09 hours
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Healthcare, Finance, Marketing, E-commerce, Social media analysis. Practical implementation of machine learning algorithms on real datasets, Project planning, execution, and presentation Ethical considerations in machine learning projects

Total Lecture Hours	45 hours
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Textbooks:

	Authors Name
1. Pattern Recognition and Machine Learning, Springer, 1st Edition , 2006	Christopher M. Bishop
2. Machine Learning: A Probabilistic Perspective, The MIT Press, 1st Edition , 2012	Kevin P. Murphy
3. Machine Learning, McGraw-Hill Education, 1st Edition , 2017	Tom M. Mitchell

Reference Books:

	Authors Name
1. Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow, O'Reilly Media, 3rd Edition , 2022	Aurélien Géron
2. Introduction to Machine Learning with Python, O'Reilly Media, 1st Edition , 2016	Andreas C. Müller and Sarah Guido
3. The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer, 2nd Edition , 2009	Trevor Hastie, Robert Tibshirani and Jerome Friedman

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	10Hrs00Min
Video Lectures	https://nptel.ac.in/courses https://onlinecourses.nptel.ac.in/ https://www.coursera.org/learn/machine-learning https://developers.google.com/machine-learning/crash-course	40Hrs00Min 36Hrs00Min 55Hrs00Min 15Hrs00Min
Web References	https://developers.google.com/machine-learning https://scikit-learn.org/ https://archive.ics.uci.edu/ml	

Course Code: BMICA0612Z			Course Name: Fundamentals of Digital Marketing and Analytics			L	T	P	C
Course Offered in: MCA Integrated						3	0	0	3
Pre-requisite: Creative thinking and which is being used by the creative talent in your business areas.									
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 data mining 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	1	2	1	
CO2	3	3	2	2	3	2	2	1	
CO3	3	3	3	2	3	2	3	2	
CO4	2	3	2	3	3	2	3	2	
CO5	3	3	3	3	3	2	3	2	
Course Contents / Syllabus									
Unit 1		Fundamentals of Digital marketing							09 hours
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 & Netizen's expectation & influence wrt Digital Marketing.									
Unit 2		Introduction to Data Analytics							09 hours
Sources and nature of data, classification of data (structured, semi-structured, unstructured), characteristics of data, introduction to Big Data platform, need of data analytics, evolution of analytic scalability, analytic process and tools, analysis vs reporting, modern data analytic tools, applications of data analytics. Need, key roles for successful analytic projects, various phases of data analytics lifecycle – discovery, data preparation, model planning, model building, communicating results, operationalization.									
Unit 3		Prepare Data for Exploration and Stakeholder							09 hours
Prepare Data for Exploration and Stakeholder-data analysts, balance needs and expectations, managing 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	Introduction to Data Mining	09 hours
Where data lives- databases, access them and extract, filter, and sort the data, metadata and its different types and how analysts use them. 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	09 hours
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
Textbooks:		
	Authors Name	
1.Digital Marketing, Oxford University Press India, November 2015	Vandana Ahuja	
2.Strategic Digital Marketing: Top Digital Experts Share the Formula for Tangible Returns on Your Marketing Investment, McGraw-Hill Professional, October 2013.	Eric Greenberg and Alexander Kates	
3.Digital Marketing: Strategy, Implementation and Practice, Pearson, 8th Edition , 2022.	Dave Chaffey and Fiona Ellis-Chadwick	
Reference Books:		
	Authors Name	
1.Fundamentals of digital Marketing” Pearson Publications – 29 June 2023	Puneet Bhatia	
2.Marketing Analytics”- Wiley Publication, 2021	Seema Gupta	
3. Marketing 5.0: Technology for Humanity, Wiley, 1st Edition , 2021	Philip Kotler, Hermawan Kartajaya and Iwan Setiawan	
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	10Hrs00Min
Video Lectures	https://nptel.ac.in/courses https://swayam.gov.in/ https://learndigital.withgoogle.com/digitalgarage https://academy.hubspot.com/courses/digital-marketing	30Hrs00Min 25Hrs 00Min 40Hrs 00Min 05Hrs 30Min
Web References	https://learndigital.withgoogle.com/digitalgarage https://academy.hubspot.com/ https://analytics.google.com/ https://nptel.ac.in/	



Course Code: BMICA0613Z			Course Name: CRM Administration					L	T	P	C
Course Offered in: MCA Integrated								3	0	0	3
Pre-requisite: Basic understanding of CRM, Basic knowledge of computer, marketing concepts and good communication skills.											
Course Objectives:											
Understand the working concept of Trailhead and importance of Salesforce. To make familiar with data modelling and security concepts.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Describe the working of Trailhead							K3			
CO2	Describe the importance of Salesforce and its features							K2			
CO3	Implement the validations							K3			
CO4	Discuss the concept and 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	3	1	-	-	-	-	2	1			
CO2	3	2	-	1	1	1	2	2			
CO3	2	3	3	-	1	1	3	1			
CO4	3	2	1	1	1	1	3	2			
CO5	1	2	2	1	2	2	3	1			
Course Contents / Syllabus											
Unit 1		Trailhead and Trailblazer Community							09 hours		
Trailhead and Trailblazer Community, Impacts of the fourth Industrial Revolution, Trailhead Playground Management											
Unit 2		Salesforce Platform Basic							09 hours		
Salesforce Platform Basic, Salesforce User Basic, Lightning Experience User Basic, Lightning Experience Basics											
Unit 3		Data Modelling							09 hours		
Data Modelling , Formulas and Validations, Picklist Administration, AppExchange, Basic Data Management											
Unit 4		Lightening Experience Customization							09 hours		
Lightening Experience Customization, Salesforce Mobile App Basics, User Management											
Unit 5		Data Security							09 hours		
Data Security, Salesforce Mobile App Customization, Security specialist											
									Total Lecture Hours		45 hours
Textbooks:											
								Authors Name			
1.Customer Relationship Management: Concepts and Cases, 2nd Edition, PHI Learning, 2018								Alok Kumar Rai			
2.Customer Relationship Management, Wiley Dreamtech, 2019								Bhasin			
3.Customer Relationship Management: Concepts and Technologies, 4th Edition, Routledge, 2022								Francis Buttle and Stan			
Reference Books:											
								Authors Name			



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1.Salesforce Essentials for Administrators, 1st Edition, 2018	Shrivasthava Mohith
2.Salesforce: A Quick Study Laminated Reference Guide, eBook Edition, Amazon, 2018	Christopher Mathew Spencer
3.Learning Salesforce Development with Apex, 2nd Edition, Packt Publishing, 2020	Paul Battisson

Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses	10Hrs00Min
Video Lectures	https://trailhead.salesforce.com/	18Hrs00Min
	https://trailhead.salesforce.com/credentials/administrator	25Hrs00Min
	https://www.youtube.com/@SalesforceDevelopers	15Hrs00Min
	https://www.simplilearn.com/	20Hrs00Min
Web References	https://trailhead.salesforce.com/	
	https://developer.salesforce.com/	
	https://help.salesforce.com/	
	https://www.salesforce.com/resources	



LAB Course Code: BMICA0651				LAB Course Name: Advance Java Lab				L	T	P	C	
Course Offered in: MCA Integrated								0	0	4	2	
Pre-requisite: knowledge of java ,OOPs												
Course Objectives:												
To create a fully functional window-based applications. To develop GUI applications, and designing and implementing Component based application like Jelly Beans, Color bean, and designing of server-side pages, client server interactions with TCP.												
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)				
CO1	Develop the window-based applications.								K5			
CO2	Create a client and server communication using net package.								K5			
CO3	Develop reusable software components using java beans								K4			
CO4	Demonstrate server-side programming.								K3			
CO5	Create the dynamic web pages using JSP.								K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1		3	1	-	-	-	-	2	3			
CO2		2	2	-	-	1	2	2	1			
CO3		3	3	2	1	1	1	3	2			
CO4		1	2	1	1	2	1	3	1			
CO5		1	2	2	1	2	2	3	1			
Sr. No	Program Title								CO Mapping			
1	Write a Java Program to create an applet that show a simple message along with background and foreground colors?								CO1			
2	Write a Java Program to create an applet that scrolls a message from left to right?								CO1			
3	Write a Java Program to create an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.								CO1			
4	Write a Java Program to create an applet that receives a string and returns either it Uppercase or Lowercase, Reverse of given string, and length of a given String.								CO1			
5	Write a java program to draw Lines, ovals, filled ovals and arcs, filled arcs?								CO1			
6	Write a java program to draw rectangle, filled rectangle and rounded rectangle and filled rounded rectangle with any two colors?								CO1			
7	Write a java program to draw a smiley face?								CO1			
8	Write a Java program to demonstrate the mouse event handlers.								CO1			
9	Write a Java program to demonstrate the key event handlers.								CO1			
10	Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 werenot an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.								CO1			



11	Write a Java program that works as a simple calculator. Use a grid lay	CO1
12	Write a Java Program to create 4 push Buttons bearing the names of 4 colors. When a button is clicked, that particular color is set as background color in a frame?	CO1
13	Write a Java Program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time. No light is on when the program starts.	CO1
14	Write a Java Program a simple user form which reads the name of a user and mail id in Text fields, select gender with radio buttons, and selects some Known languages using checkboxes, and also enters an address in a text area. After filling details whenever a user presses the "submit" button, then displays all the information about the user input.	CO1
15	Write a Java Program to create multiple frames, which create a Frame2 with a 'back' button, such that when a user click 'back' button, Frame 2 is closed and we see the Frame1 only?	CO1
16	Write a Java Program to create an applet using Swings which contains two push buttons. If a user presses a particular button then display a message 'selected' button is pressed.	CO1
17	Write a Java Program to create a frame using swing in which create a push button with a label and image. When the button is clicked an image is displayed in the Frame?	CO1
18	Write a Java Program to create a student table, which includes name, roll no, branch and age or DOB?	CO1
19	Write a Java Program to create a tabbed pane with two tabs. In the first tab sheet, display some push buttons with names of Branches. In second tab sheet, display checkboxes with names of subjects.	CO1
20	Write a java program to create a menu with several menu items by implementing JMenu.	CO1
21	Write a java program to create a combo box with some name of some places. The user can select any one name from the list and the selected country name is displayed in the frame? (Use JComboBox)	CO1
22	Write a java program to select multiple places and displayed in Frame using JList?	CO1
23	Write a java program to create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window"	CO3
24	Write a java program to create a bean that performs conversion of American dollar to Indian rupee.	CO3
25	Write a java program to create a bean that counts the number of button clicks?	CO3
26	Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)	CO2
27	Write a Java program to retrieve the information from the given URL? (Note: Read the URL from Command Line Arguments)	CO4
28	Write a java program to create a sample TCP chat application where client and server can chat with each other?	CO4
29	Installation of Apache Tomcat webserver	CO4
30	Write a java Program to create a simple servlet and run it using tomcat server.	CO5
31	Write a java Program to create a JSP page to display a simple message along with	CO5



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	currentDate?	
32	Write a java Program to create a JSP page to display the random number?	CO5
33	Write a java Program to create a User request page in JSP?	CO5
		Total Hours: 30 hrs.



LAB Course Code: BMICA0652Z			LAB Course Name: Computer Graphics and Multimedia Lab				L	T	P	C
Course Offered in: MCA Integrated							0	0	4	2
Pre-requisite: Basic knowledge of Programming in C/C++, Data Structures, Mathematics, and Computer Graphics fundamentals.										
Course Objectives:										
To implement drawing algorithm, polygon fitting, clipping and 2D transformation curves and an introduction to 3D transformation. It provides the basics of OpenGL application programming interface which allows students to develop programming skills in CG.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Apply and compare the algorithms for drawing 2D images also explain aliasing, anti aliasing and half toning techniques							K4		
CO2	Analyze and apply clipping algorithms and transformation on 2D images.							K4		
CO3	Solve the problems on viewing transformations and explain the projection And hidden surface removal algorithms.							K3		
CO4	Use of geometric transformations on graphics objects and their application in composite form.							K3		
CO5	Extract scene with different clipping methods and its transformation to graphics display device.							K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1		3	1	-	-	-	-	2	1	
CO2		2	2	-	-	2	1	2	2	
CO3		2	3	2	1	1	2	3	1	
CO4		2	1	1	1	1	1	3	2	
CO5		1	2	2	1	2	2	3	1	
Sr. No	Program Title								CO Mapping	
1	To Study various in build graphics functions in Python library.								CO1	
2	Write a program to draw a line using DDA algorithm.								CO1	
3	Write a program to draw a line using Bresenham's algorithm.								CO1	
4	Write a program to draw a circle using midpoint algorithm.								CO1	
5	Write a program to draw a circle using Bresenham's algorithm.								CO1	
6	Write a program to draw a rectangle using line drawing algorithm.								CO1	
7	Write a program to perform 2D Transformation on a line.								CO2	
8	Write a program to perform shear transformation on a rectangle.								CO2	
9	Write a program to rotate a circle (alternatively inside and outside) around the circumference of another circle.								CO2	



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10	Write a program to draw a car using in build graphics function and translate it from bottom left corner to right bottom corner of screen.	CO2
11	Write a program to draw balloons using in build graphics function and translate it from bottom left corner to right top corner of screen.	CO2
12	Write a program to draw a cube using in build library function and perform 3D transformations i) Translations in x, y, z directions ii) Rotation by angle 450 about z axis, rotation by 600 about y-axis in succession. Scaling in x-direction by a factor of 2, scaling in y- direction by a factor of 3.	CO3
13	Write a program to implement line clipping (Cohen Sutherland algorithm).	CO3
14	Write a program for making Bezier curve.	CO4
15	Write a program to study various in build functions for 2D drawing in MAYA software.	CO4
16	Write a program to show animation of a ball moving in a helical path.	CO5
		Total Hours: 30 hrs.



LAB Course Code: BMICA0653Z			LAB Course Name: Computer Network Lab					L	T	P	C
Course Offered in: MCA Integrated								0	0	2	2
Pre-requisite: Basic knowledge of Computer Networks, Operating Systems, IP Addressing, Networking Devices, and Network Configuration.											
Course Objectives:											
To provide hands-on experience with network design, configuration, and troubleshooting, covering protocols, hardware, and software tools to build and maintain reliable and efficient network systems.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Identify and use various networking components Understand different transmissionmedia and design cables for establishing a network							K1			
CO2	Implement any topology using network devices							K3			
CO3	Analyze performance of various communication protocols.							K			
CO4	Discuss TCP/IP configuration for Windows and Linux							K2			
CO5	Demonstrate the major software and hardware technologies used on computer Networks							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		3	1	-	-	-	-	2	2		
CO2		3	2	1	2	1	1	2	2		
CO3		3	3	2	2	1	1	3	1		
CO4		2	2	1	1	1	1	3	1		
CO5		1	2	2	1	2	2	3	1		
Sr. No	Program Title									CO Mapping	
1	Connect and configure basic network devices (switch, router, PC).									CO1	
2	Create straight-through and crossover cables, test connectivity.									CO1	
3	Configure a switch with a hostname, passwords, and basic settings.									CO1	
4	Use commands to explore and clear the MAC address table on a switch.									CO1	
5	Create and assign VLANs on a switch, verify VLAN configurations.									CO1	
6	Configure a router with a hostname, passwords, and basic settings.									CO1	
7	Assign IP addresses to devices, subnet a network, and configure interfaces.									CO1	
8	Configure static routes between two or more routers.									CO1	
9	Set up a router or server as a DHCP server, configure DHCP pools.									CO2	
10	Use ping and traceroute to test connectivity and understand network paths.									CO2	
11	Configure a router on a stick or a Layer 3 switch for inter-VLAN routing.									CO2	
12	Configure STP on switches, test failover scenarios.									CO2	



13	Configure EtherChannel between switches, verify configuration.	CO2
14	Configure EIGRP on routers, verify and troubleshoot EIGRP.	CO2
15	Configure OSPF on routers, understand and verify OSPF areas.	CO3
16	Configure standard and extended ACLs, apply them to interfaces.	CO3
17	Configure static and dynamic NAT, and PAT on a router.	CO3
18	Configure Syslog for logging and NTP for time synchronization.	CO3
19	Configure a basic wireless LAN, set up SSIDs and security settings.	CO3
20	Diagnose and resolve common VLAN and routing problems	CO3
21	Configure SSH for secure remote access to network devices.	CO3
22	Configure basic firewall rules on a router or firewall device.	CO3
23	Configure IPS features on a network device, monitor alerts.	CO3
24	Apply best practices for securing network devices (e.g., disable unused services, secure passwords).	CO3
25	Configure port security on switches to restrict access based on MAC addresses.	CO3
26	Implement VLAN access control policies and verify their effects.	CO4
27	Write simple Python scripts to automate network configurations.	CO4
28	Use Ansible to automate device configuration tasks.	CO4
29	Set up SNMP for monitoring network devices.	CO4
30	Set up and verify IPsec VPN connections between routers.	CO4
31	Configure RSTP or MSTP, and test failover scenarios.	CO4
32	Configure OSPF for multiple areas, verify route propagation.	CO4
33	Configure basic BGP between routers, verify and troubleshoot BGP peering.	CO4
34	Configure route redistribution between different routing protocols.	CO4
35	Implement basic QoS policies on a router or switch.	CO5
36	Configure basic MPLS settings, verify MPLS forwarding.	CO5
37	Set up GRE tunnels between routers, test and verify tunnel connectivity.	CO5
38	Configure and verify DMVPN in a hub-and-spoke topology.	CO5
39	Configure VRRP or HSRP for gateway redundancy.	CO5
40	Set up and test IP SLA for monitoring and troubleshooting	CO5
41	Create a network design diagram using tools like Cisco Packet Tracer or GNS3.	CO5
42	Configure redundant links and devices, test failover scenarios.	CO5
43	Plan and design a wireless network for an office environment.	CO5
44	Use structured methodologies (e.g., OSI model approach) to troubleshoot network issues.	CO5
45	Use Wireshark to capture and analyze network traffic.	CO5



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46	Set up SNMP monitoring on network devices, use SNMP tools to gather information.	C05
47	Resolve VLAN-related issues based on a provided network scenario.	C05
48	Troubleshoot and resolve issues with routing protocols (e.g., OSPF, EIGRP).	C05
49	Design and implement a network with redundant paths and devices.	C05
50	Diagnose and resolve common wireless network problems.	C05
		Total Hours: 30 hrs.

Course Code: BMICANC0601/ BMICANC0602				Course Name: Constitution of India, Law and Engineering* / Essence of Indian Traditional Knowledge				L	T	P	C
Course Offered in: MCA Integrated								2	0	0	0
Pre-requisite: Basic Understanding of the Indian Tradition.											
Course Objectives:											
This course aims to provide basic knowledge about different theories of society, state and polity in India, Indian literature, culture, Indian religion, philosophy, science, management, cultural heritage and different arts in India											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Understand the basics of past Indian politics and state polity.								K2		
CO2	Understand the Vedas, Upanishads, languages & literature of Indian society.								K2		
CO3	Know the different religions and religious movements in India.								K4		
CO4	Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda.								K4		
CO5	Identify Indian dances, fairs & festivals, and cinema.								K1		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	1	-	-	-	-	2	1			
CO2	3	2	1	-	1	1	2	2			
CO3	2	3	1	-	1	1	3	3			
CO4	2	1	1	1	1	1	3	1			
CO5	1	2	2	1	2	2	3	1			
Course Contents / Syllabus											
Unit 1		Society State And Polity In India							09 hours		
Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.											
Unit 2		Indian Literature, Culture, Tradition, And Practices							09 hours		
Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali, Prakrit And Sanskrit, Sikh Literature, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature, Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature											
Unit 3		Indian Religion, Philosophy, And Practices							09 hours		
Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.											
Unit 4		Science, Management And Indian Knowledge System							09 hours		
Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India , Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India, Writing Technolog											



Unit 5		Cultural Heritage And Performing Arts	09 hours
Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema			
Total Lecture Hours			45 hours
Textbooks:			
			Authors Name
1. Indian Polity for Civil Services and Other State Examinations, 6th Edition, McGraw Hill			M. Laxmikanth
2. Introduction to the Indian Constitution, 8th Edition, PHI Learning Pvt. Ltd.			Brij Kishore Sharma
3. Introduction to the Constitution of India, 26th Edition, LexisNexis			Durga Das Basu
Reference Books:			
			Authors Name
The Indian Constitution, Oxford University Press.			Madhav Khosla
The Constitution of India, Latest Edition, Universal Law Publishing			PM Bakshi
Law Relating to Intellectual Property Rights (2007)			V.K. Ahuja
Self-Study Content Links:			Duration (in Hrs)
MOOCs	https://nptel.ac.in/courses		10 Hrs00Min
Video Lectures	https://nptel.ac.in/courses https://swayam.gov.in/ https://cec.nic.in/ https://epgp.inflibnet.ac.in/		30Hrs00Min 24Hrs00Min 18Hrs00Min 20Hrs00Min
Web References	https://legislative.gov.in/constitution-of-india https://www.india.gov.in/ https://epgp.inflibnet.ac.in/ https://www.aicte-india.org/		