

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



Affiliated to

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



Evaluation Scheme & Syllabus

For

Bachelor of Computer Applications

Second Year

(Effective from the Session: 2026-27)

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

S. 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	CBCA0301	Computer Networks	Mandatory	3	0	0	20	30	50		100		150	3
2	CBCA0302	Operating System	Mandatory	3	1	0	20	30	50		100		150	4
3	CBCA0303	Principles of Virtualization	Mandatory	3	0	0	20	30	50		100		150	3
4		Departmental Elective - I	Departmental Elective	3	0	0	20	30	50		100		150	3
5	CBCA0352	Operating System Lab	Mandatory	0	0	2				50		50	100	1
6	CBCA0354	Workplace Communication Lab 3	Mandatory	0	0	4				50		50	100	2
7	CBCA0355	Object Oriented Programming using Java	Mandatory	0	0	6				50		100	150	3
8		Departmental Elective - I Lab	Departmental Elective	0	0	2				50		50	100	1
9	CBCA0356	Personality Development and Professional Skills	Mandatory	0	0	2				50		50	100	1
		TOTAL							200	250	400	300	1150	21

List of MOOCs (Infosys Springboard) Based Recommended Courses for Second Year (Semester-III) BCA

S. No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours
1	CMC0018	Linux for Beginners	Infosys Wingspan (Infosys Springboard)	6h 2m
2	CMC0043	Java Concepts	Infosys Wingspan (Infosys Springboard)	7h 34m

Abbreviation Used:

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

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

List of Department Elective (if any):-

S. No.	Subject Code	Subject Name	Bucket Name	Semester
1	CBCA0311	Artificial Intelligence	Emerging Technologies	III
2	CBCA0312	Canva & Corel draw	Graphics & Video editing	III
3	CBCA0313	CRM Fundamentals	CRM/RPA	III
4	CBCA0311P	Artificial Intelligence Lab	Emerging Technologies Lab	III
5	CBCA0312P	Canva & Corel draw Lab	Graphics & Video editing Lab	III
6	CBCA0313P	CRM Fundamentals Lab	CRM/RPA Lab	III

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

S. 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	CBCA0401	Cognitive Ability	Mandatory	3	0	0	30	20	50		100		150	3
2	CBCA0402	Database Management System	Mandatory	3	0	0	30	20	50		100		150	3
3	CBCA0403	Digital Marketing	Mandatory	3	0	0	30	20	50		100		150	3
4	CBCA0404	Data Science	Mandatory	3	0	0	30	20	50		100		150	3
5		Departmental Elective - II	Departmental Elective	3	0	0	30	20	50		100		150	3
6	CBCA0452	Database Management System Lab	Mandatory	0	0	2				50		50	100	1
7	CBCA0455	Web Technologies	Mandatory	0	0	6				50		100	150	3
8		Departmental Elective –II Lab	Mandatory	0	0	4				50		50	100	2
9	CBCA0456	Workplace Communication Lab 4	Departmental Elective	0	0	2				50		50	100	1
		TOTAL							250	200	500	250	1200	22

List of MOOCs (Infosys Springboard) Based Recommended Courses for Second Year (Semester-IV) BCA

S. No.	Subject Code	Course Name	University/ Industry Partner Name	No. of Hours
1.	CMC0040	HTML5 - The Language	Infosys Wingspan (Infosys Springboard)	13h 17m
2.	CMC0070	Introduction to Digital Marketing	Infosys Wingspan (Infosys Springboard)	4h 30m

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):-

S. No.	Subject Code	Subject Name	Bucket Name	Semester
1	CBCA0411	Image Editing with Photoshop	Graphics & Video editing	IV
2	CBCA0412	CRM Administration	CRM/RPA	IV
3	CBCA0413	Machine Learning	Emerging Technologies	IV
4	CBCA0411P	Image Editing with Photoshop Lab	Graphics & Video editing Lab	IV
5	CBCA0412P	CRM Administration Lab	CRM/RPA Lab	IV
6	CBCA0413P	Machine Learning Lab	Emerging Technologies Lab	IV

Course Code: CBCA0301				Course Name: Computer Networks				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic computer concepts and terminology.											
Course Objectives: After completion of the course, the student will be able to											
To develop understanding the 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. Classify various IP addressing techniques, sub netting along with network routing protocols and algorithms. Understand various transport layer protocols and their design considerations along with congestion control to maintain Quality of Service. Understand Applications-layer protocols and elementary standards of cryptography and network security.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Identification of Network Fundamentals									K1	
CO2	Classify various IP addressing techniques.									K2	
CO3	Description, implementation and verification of IP routing technologies.									K3	
CO4	Identification and configuration of LAN switching technologies.									K1	
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	3	1	1	2	1	1	1			
CO2	3	2	2	2	2	1	1	1			
CO3	3	3	3	3	3	1	1	1			
CO4	3	2	3	2	3	1	1	2			
CO5	3	3	2	3	3	2	1	2			
Course Contents / Syllabus											
Unit 1		Network Fundamentals							09 hours		
Basic network concepts, Network architecture and topologies, OSI and TCP/IP models. Cabling and network devices, Ethernet standards and technologies MAC addressing and ARP, VLANs and trunking IP addressing and subnetting, IPv4 vs. IPv6, Routing basics and protocols (e.g., RIP, EIGRP, OSPF) TCP and UDP operations, Port numbers and sockets Common network services and protocols (e.g., HTTP, FTP, DNS)											
Unit 2		Network Access and IP Connectivity							09 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							09 hours		
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							09 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 Trouble shooting	09 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 virtualizationStudio, introduction to data science workflow, applications of IT in healthcare, education, smart cities, sustainable computing, role of IT in Industry 4.0.		
Total Lecture Hours		45 hours
Textbook:		
1 —Data Communication and NetworkingI, Mc Graw Hill Edition, 6th 2022		Behrouz Forouzan,
2 —Computer NetworksI, Pearson Education, Edition 6th 2019		Andrew Tanenbaum
3—Data and Computer CommunicationI, Pearson, 10th Edition 2017		William Stallings
Reference Books:		
1, —Computer Networking, A Top-Down ApproachI, Pearson. Eighth Edition,2021		Kurose and Ross
2 —Computer Networking A Top- Down ApproachI 8th Edition, Pearson Education 2022		James F. Kurose
Self-Study Content Links:		Duration (in Hrs)
MOOCs	NPTEL Computer Networks – https://nptel.ac.in/courses/106105183	5 hrs
Video Lectures	Neso Academy Computer Networks – https://www.youtube.com/@nesoacademy	10 hrs
Web References	TutorialsPoint Computer Networks – https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm	

Course Code: CBCA0302			Course Name: Operating System					L	T	P	C
Course Offered in: BCA								3	1	0	4
Pre-requisite: Basic knowledge of Operating System, Familiarity with system software and command-line interfaces.											
Course Objectives:											
To provide students with comprehensive understanding of operating system concepts, principles, and architectures across various platforms including DOS, Windows, and Unix/Linux. To develop practical skills in utilizing different user interfaces, computing environments, and system calls required for effective interaction with operating systems. To foster analytical and implementation abilities in core operating system functionalities including process management, memory management, and file system operations.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Recall and recognize basic concepts of operating systems including their types, evolution, and functions							K1			
CO2	Apply concepts of user interfaces and implement programs using system calls in different computing environments							K3			
CO3	Analyze and implement process management techniques and CPU scheduling algorithms							K4			
CO4	Implement memory management techniques and page replacement algorithms							K4			
CO5	Analyze file system structures and implement various file allocation and management techniques							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	2	1	1	1	2			
CO2	3	2	2	3	2	1	2	2			
CO3	3	3	3	3	2	1	2	2			
CO4	3	3	3	3	2	1	2	2			
CO5	3	3	3	3	2	1	2	2			
Course Contents / Syllabus											
Unit 1		Introduction to Operating Systems							12 hours		
Introduction to Operating System, Goals, Evolution of Operating System, Functions of Operating System, Types of Operating Systems - Batch Processing, Multiprogramming, Multitasking, Time Sharing, Real Time, Multiprocessor, Distributed, Windows, DOS, Unix/Linux, System Calls											
Unit 2		User Interface & Computing Environments							12 hours		
User Interfaces - Command User Interface (CUI), Graphical User Interfaces (GUI), Difference between CUI and GUI, Computing Environments, Traditional Computing, Client-Server Computing, Peer-to-Peer Computing, Web-based Computing											
Unit 3		Process Management							12 hours		
Program Vs Process, Process States, Process State Transition Diagram, Process Control Block, Context Switching, Inter-Process Communication - Shared Memory & Message Passing System, CPU scheduling algorithms (FCFS, SJF, Priority, Round Robin), Scheduling criteria											
Unit 4		Memory Management							12 hours		
Memory hierarchy, Memory allocation schemes, Fixed and variable partitions, Paging, Virtual memory concepts, Page replacement algorithms (FIFO)											
Unit 5		File Systems							12 hours		
File concepts, File operations, Directory structures, File system implementation, Allocation methods, Free space management, File protection											
									Total Lecture Hours		60 hours
Textbook:											
1. Operating System Concepts John Wiley & Sons Inc; 10th edition (9 February 2021)							Abraham Silberschatz, Peter Baer Galvin and Greg Gagne				

2."Modern Operating Systems", Pearson Education, 3rd Edition, (2008)		Andrew S. Tanenbaum
Reference Books:		
1. "Operating Systems: Internals and Design Principles", 7th Edition, (2011)		William Stallings
2."Operating Systems", Pearson Education, (2010)		Sibsankar Halder, Alex A. Aravind,
Self-Study Content Links:		Duration (in Hrs)
MOOCs	NPTEL – Operating System Fundamentals (https://nptel.ac.in)	15 hrs
Video Lectures	Gate Smashers – Operating System Playlist (https://www.youtube.com/@GateSmashers)	10 hrs
Web References	GeeksforGeeks Operating System Tutorials (https://www.geeksforgeeks.org/operating-systems/)	

Course Code: CBCA0303				Course Name Principles of Virtualization				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Knowledge of operating systems, computer architecture, and networking. Proficiency in programming languages like C/C++. Familiarity with Linux, command-line interfaces, and virtualization tools is essential.											
Course Objectives: After completion of the course, the student will be able to											
The objective of this course is to introduce the virtualization fundamentals and learn to deploy and manage virtual environments, ensuring efficient use of resources and enhancing system flexibility and management.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the concept of virtualization and it's properties.								K3		
CO2	Compare different forms of virtualization.								K2		
CO3	Examine various architecture for implementing virtualization methods.								K4		
CO4	Apply techniques for virtualizing and managing the hardware components of a computer system.								K3		
CO5	Apply Virtualization concepts at server, client and desktop level.								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	2	1	1	1			
CO2	3	3	1	2	2	1	1	1			
CO3	3	3	2	3	2	1	1	1			
CO4	3	2	3	2	3	1	1	2			
CO5	3	3	3	2	3	1	1	2			
Course Contents / Syllabus											
Unit 1		Overview of virtualization							09 hours		
Basics of Virtualization - Virtualization Types, Desktop Virtualization, Network Virtualization, Server and Machine Virtualization, Storage Virtualization, System-level or Operating Virtualization, Application Virtualization, Virtualization Advantages, Virtual Machine Basics, Taxonomy of Virtual machines - Process Virtual Machines System Virtual Machines, Hypervisor, Key Concepts Hardware Virtualization, Virtual Hardware Overview, Sever Virtualization, Physical and Logical Partitioning, Types of Server Virtualization, Business cases for Sever Virtualization, Uses of Virtual server Consolidation, Planning for Development, Selecting server Virtualization Platform.											
Unit 2		Binary Translation and Optimization							09 hours		
Virtual Machine basics, Interpretation, Interpreting Complex Instruction Set, Binary Translation, Dynamic Translation, Instruction Set issues, case Study Dynamic Binary Optimization: Program behavior, profiling, optimizing translation blocks, framework, code reordering, optimization, ISA optimization system, VM Architecture: Object-oriented high-level language virtual machines, JVM architecture, Microsoft Common Language Infrastructure.											
Unit 3		Network Virtualization							09 hours		
Design of Scalable Enterprise Networks, Virtualizing the Campus WAN Design, WAN Architecture, WAN Virtualization, Virtual Enterprise Transport Virtualization, VLANs and Scalability, Theory Network Device											

Virtualization Layer 2, VLANs Layer 3 VRF Instances Layer 2, VFI's Virtual Firewall Contexts Network Device Virtualization, Data - Path Virtualization Layer 2: 802.1q, Trunking Generic Routing Encapsulation, IPsec L2TPv3 Label Switched Paths, Control, Plane Virtualization, Routing Protocols, VRF, Aware Routing Multi-Topology Routing.

Unit 4	Virtualizing Storage SCSI	09 hours
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Virtualizing Storage SCSI with Power BI Editor, General Properties, Sizing, Dimensions, and Positions, Alternate Text and Tiles. Header (Column, Row) Properties, Grid Properties (Vertical, Horizontal) and Styles, Table Styles & Alternate Row Colors - Static, Dynamic, Sparse, Flashy Rows, Condensed Table Reports Focus Mode, Totals Computations, Background. Borders.

Unit 5	Security in Virtualization	09 hours
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Security in Virtualization: Security challenges in virtual environments, Isolation and containment, Security best practices and tools, Performance Tuning and Optimization: Performance metrics and monitoring, Techniques for optimizing virtual environments, Load balancing and high availability, Virtualization Tools and Technologies: Overview of popular virtualization platforms (VMware, Hyper-V, KVM, Xen), Hands-on labs with VMware vSphere and Microsoft Hyper-V, Comparative analysis of virtualization tools.

Total Lecture Hours	45 hours
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Textbook:	
1., —Building Cloud and Virtualization Infrastructure: A Hands-on Approach to Virtualization and Implementation of a Private Cloud Using Real-time Use-cases, bpb, First Edition, 2021	Mrs. Lavanya S, Dr. Balamurugan S, Dr. Venkatachalam K, Dr. Saravanakumar N M
2., —Instant Hyper-V Server Virtualization Starter, Packet Publishing Limited, 2013.	Eguibar Vicente Rodriguez

Reference Books:	
1., —Virtualization Essentials, Sybex, 2012	Matthew Portnoy
2., —Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Learning, 2012.	Kris Jamsa

Self-Study Content Links:	Duration (in Hrs)
MOOCs	NPTEL Cloud Computing & Virtualization – https://nptel.ac.in
Video Lectures	Simplilearn Virtualization Tutorials – https://www.youtube.com/@SimplilearnOfficial
Web References	VMware Documentation – https://docs.vmware.com

Course Code: CBCA0311			Course Name: Artificial Intelligence				L	T	P	C
Course Offered in: BCA							3	0	0	3
Pre-requisite: Basic Knowledge of Transform techniques										
Course Objectives: After completion of the course, the student will be able to										
The objective of this syllabus is to equip learners with essential graphic design skills using Canva and CorelDRAW, enabling them to create professional designs for digital and print media. It focuses on both fundamental and advanced techniques to prepare students for industry applications and portfolio development.										
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy		
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 strong familiarity with some important AI techniques, including in particular, 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 critically the techniques presented and apply them to real-world problems						K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	3	2	1	3	-	-	-	2		
CO2	3	2	2	3	2	-	-	2		
CO3	3	3	3	3	-	-	-	2		
CO4	3	3	3	3	2	-	-	2		
CO5	3	3	3	3	3	-	-	3		
Course Contents / Syllabus										
Unit 1		Introduction							09 hours	
ntroduction 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 Systems, 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 & 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, 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
Textbook:			
1. Artificial Intelligence – A Modern Approach, Pearson Education. Fourth Edition 2021 —,		Stuart Russell and Peter Norvig	
2. Artificial Intelligence, McGraw-Hill Third Edition 2010 —		Elaine Rich and Kevin Knight	
Reference Books:			
1. Artificial Intelligence, Pearson Education. Inc, Third Edition, 2015		Patrick Henry Winston	
1. Artificial Intelligence - A New Synthesis, Harcourt Asia Pvt. Ltd, 1998,		Nils J. Nilsson	
Self-Study Content Links:			Duration (in Hrs)
MOOCs	NPTEL Introduction to AI – https://nptel.ac.in		12 hrs
Video Lectures	freeCodeCamp AI Course – https://www.youtube.com/@freecodecamp		10 hrs
Web References	Towards Data Science – https://towardsdatascience.com		

Course Code: CBCA0312				Course Name: Canva & Corel DRAW				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic computer skills, internet access, and a creative mindset.											
Course Objectives: After completion of the course, the student will be able to											
The objective of this syllabus is to equip learners with essential graphic design skills using Canva and CorelDRAW, enabling them to create professional designs for digital and print media. It focuses on both fundamental and advanced techniques to prepare students for industry applications and portfolio development.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the basic design principles, color theory, and Canva interface.							K2			
CO2	Apply Canva tools to create professional social media graphics, presentations, and animations.							K3			
CO3	Analyze vector and raster graphics and create simple vector illustrations using CorelDRAW.							K4			
CO4	Develop branding materials like logos, brochures, and business cards using advanced CorelDRAW tools.							K5			
CO5	Design a professional portfolio with real-world applications in digital and print media.							K6			
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	3	-	-	-	2		
CO2		3	2	2	3	2	-	-	2		
CO3		3	3	3	3	-	-	-	2		
CO4		3	3	3	3	2	-	-	2		
CO5		3	3	3	3	3	-	-	3		
Course Contents / Syllabus											
Unit 1			Graphic Design & Canva							09 hours	
Basics of Graphic Design, Importance of Visual Communication, Overview of Canva & Its Interface, Creating & Customizing Designs, Working with Templates, Text, and Elements, Exporting & Sharing Designs.											
Unit 2			Advanced Canva Features & Applications							09 hours	
Designing Social Media Posts, Presentations, and Flyers, Using Canva Pro Features (Brand Kit, Background Remover), Animation & Video Creation, Collaborating in Teams, Canva Apps & Integrations.											
Unit 3			CorelDRAW & Vector Graphics							09 hours	
Understanding Vector Graphics & Raster Graphics, CorelDRAW Interface & Tools, Creating & Editing Shapes, Working with Colors, Fills, and Gradients, Importing & Exporting Files.											
Unit 4			Advanced CorelDRAW Techniques							09 hours	
Working with Text & Typography Effects, Image Tracing & Logo Design, Advanced Shape Editing (Weld, Trim, Intersect), Creating Brochures, Banners, and Business Cards, Printing & Prepress Techniques.											
Unit 5			Project Work & Practical Applications							09 hours	
Designing a Full Branding Kit (Logos, Business Cards, Flyers), Creating Social Media & Marketing Graphics, UI/UX Wireframes using Canva & CorelDRAW, Portfolio Development.											
									Total Lecture Hours		45 hours
Textbook:											
1. A Step-by-Step Guide on Canva with an Illustrative Approach: Essential Skills for Beginners and Digital Marketers, 1st Edition 2023								David White			
2.Mastering Canva: A Comprehensive Guide to Creating Professional Designs, 1st 2024								Sarah Parker			
Reference Books:											
1.Canva for Work: Designing Professional Graphics Made Easy								Emily Green			

2. CorelDRAW 10: The Official Guide, McGraw-Hill Education 12th Edition 2017		Steve Bain
Self-Study Content Links:		Duration (in Hrs)
MOOCs	Canva Design School – https://www.canva.com/designschool	10 hrs
Video Lectures	CorelDRAW Tutorials – https://www.youtube.com/@CorelDRAW	8 hrs
Web References	CorelDRAW Learning Center – https://learn.corel.com	11 hrs

Course Code: CBCA0313				Course Name: CRM Fundamentals				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic knowledge of Computer and Programming Language.											
Course Objectives: After completion of the course, the student will be able to											
The objective of this course is to provide a comprehensive understanding of Customer Relationship Management (CRM) and its role in enhancing customer relationships and driving business growth. It covers the impact of CRM on increasing sales, improving customer retention, and its integration with other marketing aspects. The course also explores the fundamentals of Salesforce as a key CRM platform and addresses governance and security risks to ensure data protection and compliance.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the importance of CRM.							K2			
CO2	Identify the basic knowledge of the Role of CRM in increasing the sales of the company							K1			
CO3	Describe the CRM link with the other aspects of marketing and analyze the different issues in CRM							K2			
CO4	Describe the importance of Salesforce							K2			
CO5	Discuss the knowledge about value of Governance and Security risk.							K2			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	2	2	1	1	1	2	1	2			
CO2	2	2	3	2	1	3	1	2			
CO3	2	3	3	2	2	2	1	2			
CO4	2	2	3	3	1	2	1	3			
CO5	1	2	2	3	1	2	3	3			
Course Contents / Syllabus											
Unit 1		CRM Introduction							09 hours		
Customer Relationship Management: Evolution of Relationship Marketing, Purpose, stages Issues of Relationship A Paradigm Shift, Historical Perspective, CRM Definitions, Emergence of CRM Practice, CRM Cycle, Stake holders In CRM, Significance and Types of CRM, Success Factors in CRM. Emerging Perspective: Employee-Organization Relationship, Factors effecting employee Customer Oriented Behaviour, Service Recovery Management, Customer Relationship Management in Retail Industry E-CRM in Business, Features, Technology, Advantages of E-CRM, Customer Relationship Portal, Important CRM Software											
Unit 2		CRM Concepts							09 hours		
Customer Value, Customer Expectation, Customer Satisfaction, Customer Centricity, Customer Acquisition, Customer Retention, Customer Loyalty, Customer Lifetime Value. Customer Experience Management, Customer Profitability, Enterprise Marketing Management, Customer Satisfaction Measurements, Web based Customer Support.											
Unit 3		CRM Planning and Implementation							09 hours		
Steps in Planning-Building Customer Centricity, Setting CRM Objectives, Defining Data Requirements, Planning Desired Outputs, Relevant issues while planning the Outputs, Elements of CRM plan, CRM Strategy: The Strategy Development Process. Issues and Problems in implementing CRM, Information Technology tools in CRM, Challenges of CRM Implementation.											
Unit 4		Sales force Platform Basic							09 hours		
Sales force Platform Basic: Get Started with the Sales force Platform, Discover Use Cases for the Platform, Understand the Sales force Architecture, Navigate Setup, Power Up with AppExchange Trailhead Basic: Get Started with Trailhead Find Your Way Around Trailhead Troubleshoot and Find Answers to Common Questions Sales force User Basic Welcome to Sales force, Get Started with Sales force, Work With your Sales force Admin											
Unit 5		Security & Governance							09 hours		
Governance Basic: Understand the Value of Governance Learn Governance Roles and Responsibilities Understand the Key Components of a Lean Governance Framework. Security Basic: Understand Security Risk Educate Your Users to Help Protect Your Org Choose the Right Sales force Security Settings Use Health Check to Scan Your Security Configurations											

		Total Lecture Hours	45 hours
Textbook:			
1.Customer Relationship Management: Concepts and Technologies, Routledge 4th Edition 2019		Francis Buttle, Stan Makan,	
2.Werner Customer Relationship Management Concept, Strategy and Tools, Springer 3rd Edition 2018 ,		Kumar, V., Reinartz	
Reference Books:			
1.Customer Relationship Management, PHI Learning Pvt. Ltd. 2nd Edition 2013		Alok Kumar Rai	
2. Salesforce for beginners, Packt Publishing 2nd Edition 2022		Sharif Shaalan	
Self-Study Content Links:			Duration (in Hrs)
MOOCs	Coursera CRM Courses – https://www.coursera.org		8 hrs
Video Lectures	Simplilearn CRM Tutorials – https://www.youtube.com/@SimplilearnOfficial		10 hrs
Web References	HubSpot CRM Resources – https://academy.hubspot.com		

20	Use command 'tasklist' to view running processes	CO3
21	Use 'taskkill' command to end a process	CO3
22	Create a scheduled task in Task Scheduler	CO3
23	Implement of FCFS Scheduling Algorithms.	CO4
24	Implement of SJF Scheduling Algorithms.	CO4
25	.Implement of Round-Robin Scheduling Algorithms.	CO4
26	Explore background processes and their properties	CO4
27	Check memory usage using Task Manager	CO4
28	Implementation of Page Replacement Algorithm.	CO4
29	File Operations - Organization and Search	CO5
30	Display directory structure with /F using TREE /F.	CO5
31	Navigate and manipulate folders using CD, RD, DIR commands.	CO5
32	Implement of Round-Robin Scheduling Algorithms.	CO5
33	Explore background processes and their properties	CO5
		Total Hours: 15 hrs.

LAB Course Code: CBCA0354			LAB Course Name: Workplace Communication Lab III			L	T	P	C
Course Offered in: BCA						0	0	4	2
Pre-requisite: The students should have completed Workplace Communication course in semester II									
Course Objectives:									
Develop strong language skills for effective communication in professional settings. Learn to adapt communication styles for diverse workplace scenarios and audiences. Develop crucial skills like teamwork, leadership, and problem-solving to boost career prospects.									
Course Outcome: After completion of the course, the student will be able to									
CO1	Remember the key features of building professional relationships and facing Interviews.								K1
CO2	Comprehend complex conversations and formal texts.								K4
CO3	Navigate cultural differences in communication.								K3
CO4	Scrutinize and select appropriate verbal and non-verbal signals in professional interactions.								K4
CO5	Write audience-sensitive professional documents with clarity and precision.								K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	1	1	1	1	3	1	1	2	
CO2	1	1	1	1	3	1	1	1	
CO3	1	1	1	1	3	1	1	1	
CO4	1	2	1	1	3	1	1	1	
CO5	1	1	1	1	3	1	1	1	
List Of Practical's (Indicative & Not Limited To)									CO
S.No.	List of Experiment/Program								CO
1.	Introduction To the course · Exam Pattern · Anubhav Activity on score improvement								CO1
2.	Listening to Conversations The students will develop their listening ability to comprehend English conversations, understanding and responding to it effectively.								CO2
3.	Vocabulary Building The students will enhance their vocabulary through various exercises and word-games.								CO2
4.	Role Play: Everyday Scenarios The students will practice conversations, greetings, and introductions.								CO5
5.	Recognizing and Pronouncing words accurately - To recognize and pronounce words with similar sounds accurately and understand their meanings in different contexts - Improve their overall pronunciation and comprehension								CO5
6.	Summarizing Texts The students will develop the ability to summarize texts.								CO2
7.	Group Discussions The students will improve their ability to participate in group discussions.								CO2
8.	Basic Presentation Skills The students will learn to design and deliver simple presentations.								CO5
9.	Reading Comprehension								CO4

	The students will improve their comprehension of written texts.	
10.	Story Writing and Narrating The students will practice writing short stories from their own experience and narrate it.	CO2
11	Paragraph jumbled sentences Rearranging sentences to form a coherent paragraph	CO5
12	Professional Email Writing The students will practice writing professional emails within a time period.	CO2
13	Describing Pictures The students will respond to picture prompts.	CO5
14	Story Writing and Narrating The students will practice writing short stories from their own experience and narrate it.	CO5
15	Cross-Cultural Communication Understand challenges and opportunities of communicating across cultures	CO3
16	Nonverbal Communication Demonstrate the importance of nonverbal cues in various situational communication	CO4
17	Interview Preparation: FAQs Learn to answer frequently asked interview questions confidently and effectively	CO3
18	Gender Stereotypes and Communication Recognize and address gender biases in communication	CO3
19	Networking and Building Relationships Develop skills to build professional relationships and network effectively	CO2
20	Miscommunication Reflection Students reflect on instances of miscommunication. They learn to avoid miscommunication.	CO3
21	Intercultural Sensitivity and Awareness Develop understanding of cultural differences and nuances	CO3
22	Empathetic Listening Scenarios Students will pair up in role play scenarios requiring empathetic responses. They will practice not only active listening but emotional intelligence in responses.	CO4
23	Peer Feedback The students will learn to provide and receive constructive feedback.	CO5
24	Self-Reflection The students will reflect on their learning experiences.	CO4
Total Hours: 30 hrs.		

Course Code: CBCA0355				Course Name: Object Oriented Programming using Java				L	T	P	C
Course Offered in: BCA								0	0	6	3
Pre-requisite: Basic understanding of programming concepts, along with familiarity with algorithms, and an introductory knowledge of computer systems and software development tools.											
Course Objectives: After completion of the course, the student will be able to											
To equip with the skills to design and applying object-oriented techniques to solve real-world problems efficiently using Java.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Apply the fundamental concepts of Java programming								K3		
CO2	Implement advanced OOP concepts								K3		
CO3	Apply abstraction techniques and string operations								K3		
CO4	Develop robust Java applications by implementing exception handling, file input/output operations, and multithreading techniques								K4		
CO5	Apply Java's Collections Framework and implement generics to work with data structures								K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	1	1	1	2			
CO2	3	3	3	2	2	1	1	2			
CO3	3	2	2	2	1	2	2	2			
CO4	3	3	3	3	2	2	2	3			
CO5	3	2	3	3	2	2	1	3			
Course Contents / Syllabus											
Unit 1		Basics of Java Programming & OOP concepts							09 hours		
History of Java, Features of Java, JVM architecture and its components, Java Program structure: basic syntax, data types, variables and constants, operators in Java. Decision Making, Looping and Branching, Arrays, Command Line Argument, Console Input/Output. OOP Concepts in Java (Encapsulation, Polymorphism, Inheritance & Abstraction), Characteristics of OOP, Key Concepts: Classes, Objects, Methods, and Attributes. Defining Class: class Declaration, Instance Variables, Methods, Creating Objects from Classes, Instance vs. Static Variables, Instance vs. static Methods, Getter and Setter Methods.											
Unit 2		Polymorphism, Constructors and Inheritance							09 hours		
Polymorphism Types (Compile-Time & Run-Time), Defining Methods, Method Signature, Method Overloading, Return Types and Parameters, Variable Scope (Local, Instance, and Class Variables). Default Constructor, Parameterized Constructors, Constructor Overloading, Constructor Chaining. Introduction and Types of Inheritance in Java, Access Modifiers (public, private, protected, default), Method Overriding, Constructor Overriding, Use of super and this Keywords. final variable, final method & final class, default method, Interface and it's uses.											
Unit 3		Abstraction Packages & Strings							09 hours		
Abstract Classes and Methods, Concrete Classes vs. Abstract Classes, Abstract Classes vs. Interfaces. Introduction to Lambda function and Working with Lambda Variables. Introduction to packages and Types, Access Protection in Packages, Import and Execution of Packages. String Introduction, Immutable String, Methods of String class, String Buffer and String Builder class.											
Unit 4		Exception & File Handling and Multithreading							09 hours		
Exception Handling- Exceptions & its types (Checked and Unchecked), Try-Catch Block, Throwing and Catching Exceptions, Multiple Catch Blocks, Try-Catch-Finally Block, Custom Exception Classes. Introduction to Multithreading, Thread Life Cycle, Creating Threads: Extending Thread Class and Implementing Runnable											

Interface, Thread Priorities, Daemon Thread, Synchronization in Threads, Thread Communication (wait, notify, notifyAll).
File Handling-Reading and Writing Files in Java, File Input Stream, File Output Stream, Buffered Reader, Buffered Writer,
Byte

Stream and Character Stream, Input Stream and Output Stream, Reader and Writer classes

Unit 5	Collections in Java & Generics	09 hours
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Introduction to Collections, List, Set, and Map Interfaces, Array List, LinkedList, Iterators in Collections.

Introduction to Generic Classes, Creating and Using Generic Classes and Methods.

Total Lecture Hours 45 hours

Textbook:	
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1. Java: The Complete Reference, 7th Edn, Education, 2017	Herbert Schildt, McGraw Hill
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2. Core Java: An Integrated Approach, New: Includes All Versions upto Java 8	Dreamtech Press, 2016 R. Nageswara Rao
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Reference Books:	
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1. Schaum's Outline of Programming with Java / 2nd Edition, , 2020	McGraw Hill
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2. Programming In Java Revised 2Nd Edition, Oxford University Press, 2018	Sachin Malhotra Saurabh Choudhary
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Self-Study Content Links:	Duration (in Hrs)
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MOOCs	Oracle Java Learning – https://dev.java	8 hrs
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Video Lectures	CodeWithHarry Java – https://www.youtube.com/@CodeWithHarry	10 hrs
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Web References	Javatpoint Java – https://www.javatpoint.com/java-tutorial	9 hrs
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LAB Course Code: CBCA0355				LAB Course Name: Object Oriented Programming using Java				L	T	P	C
Course Offered in: BCA								0	0	6	3
Pre-requisite: Basic understanding of programming concepts											
Course Objectives:											
To explore object-oriented methodology and its methods through collaborative, intriguing experiments.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Apply the fundamental concepts and control structures of Java programming.								K2		
CO2	Apply the concepts of object-oriented programming.								K3		
CO3	Develop competence with functional interfaces, lambda expressions, and string handling.								K4		
CO4	Implement advanced Java features file handling, exception handling multi-threading, and synchronization techniques to handle complex scenarios in Java.								K5		
CO5	Implement Java's collection framework into operation								K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	2	1	1	2			
CO2	3	3	3	3	2	1	1	2			
CO3	3	2	2	3	2	1	1	2			
CO4	3	3	3	3	2	2	2	3			
CO5	3	2	3	3	3	2	2	3			
List Of Practical's (Indicative & Not Limited To)									CO		
S.No.	List of Experiment/Program								CO		
1.	Write a program that: - Finds the area of a circle given its radius. - Demonstrates type casting from float to int. Defines a constant for the value of PI.								CO1		
2.	Write a program that uses the ternary operator to check if a number is positive or negative.								CO1		
3.	Write a program to swap two numbers using bitwise operators.								CO1		
4.	Write a program that checks if a year is a leap year or not.								CO1		
5.	Write a program to find the largest of three numbers using nested if.								CO1		
6.	Write a program to determine if a triangle is an equilateral, isosceles, or scalene based on its sides using a ladder if-else statement.								CO1		
7.	Write a program to identify the season (Winter, Spring, Summer, Fall) based on the month number (1-12) using switch statement.								CO1		
8.	Write a program to calculate the factorial of a number using a for loop.								CO1		
9.	Write a program to print the Fibonacci series up to a specified number of terms using a while loop.								CO1		
10.	Write a program to calculate the sum of digits of given numbers using do-while loop.								CO1		
11.	Write a program to check whether a given number is prime or not.								CO1		
12.	Write a program to find the maximum element in a given array.								CO1		

13	Write a program to search for a given element in an array and print its index.	CO1
14	Write a program to sort an array using the bubble sort algorithm.	CO1
15	Write a program to multiply two matrices.	CO1
16	Write a program that prints all the odd numbers between 1 and N using the continue statement.	CO1
17	Write a program that finds and prints the first prime number less than a given number using a break statement.	CO1
18	Write a program to define a class Student with instance variables name, age, and grade. Create an object and provide a method to display the value of class attributes.	CO1
19	Write a program that shows the difference between instance and static methods.	CO1
20	Write a program to demonstrate the use of getter and setter methods in a class.	CO1
21	Write a program that defines a method with a return type and parameters, that calculate the area and perimeter of a rectangle.	CO1
22	Write a program that demonstrates the scope of instance variables. Create a class with an instance variable name. Write a method to change this name and another method to display it.	CO1
23	Create a class with a static variable counter and increment it each time an object is created. Print the counter value after each creation.	CO1
24	Write a program that demonstrates the usage of varargs(Variable Length Arguments). Create a method that takes a variable number of integers and returns their sum.	CO1
25	Write a program that demonstrates method chaining. Define multiple methods in a class that return the current object, allowing methods to be called in a single statement.	CO1
26	Write a program that demonstrates method overloading by creating multiple methods to calculate the area of different shapes (circle, rectangle, etc).	CO1
27	Write a program to demonstrate method overloading in a banking system. The system should have two methods: one that accepts an account number and an amount to deposit, and another that accepts only an amount and uses a default account number.	CO1
28	Write a program that uses a default constructor to initialize the instance variables of a class. The default constructor should assign default values to the instance variables, and then print those values in the main method	CO2
29	Write a program to create a Product class with a parameterized constructor. The constructor should accept the product's name, price, and quantity, and then display the product details and calculate the total cost.	CO2
30	Write a program that demonstrates constructor overloading with default and parameterized values. Class Book has one constructor that sets default values and another constructor that accepts values from the user.	CO2
31	Write a program that demonstrates constructor overloading for initializing a Date object. One constructor should initialize the day, month, and year, while another should initialize only the day and month with the current year.	CO2
32	Write a program that demonstrates constructor chaining with multiple constructors. Class Vehicle has two constructors: one default constructor and one parameterized constructor.	CO2
33	Create a class Employee and subclass Manager to demonstrate inheritance and method overriding.	CO2
34	Create a Person class and demonstrate access modifiers.	CO2
35	Create an abstract Shape class and override area() method in Circle and Rectangle.	CO2
36	Create Person and Student classes demonstrating constructor overriding.	CO2

37	Create Book and EBook classes demonstrating super and this usage.	CO2
38	Create a Car class with a final variable, final method, and final class.	CO2
39	Create an interface Vehicle with a default method fuelEfficiency(). Implement this interface in two classes, Car and Truck, and override the fuelEfficiency() method for both classes to demonstrate default methods in interface.	CO2
40	Create two interfaces Flyable and Swimmable, both having default methods fly() and swim(). Create a class FlyingFish that implements both interfaces.	CO2
41	Create an abstract class Vehicle with an abstract method start() and a concrete method stop(). Then, create two subclasses: Car and Bike that implement the start() method and inherit the stop() method. Demonstrate the use of these classes in the main() method.	CO2
42	Create an abstract class Shape with an abstract method draw(). Then, create a concrete class Circle that implements the draw() method. Also, create another class Square that extends Shape and implements the draw() method.	CO2
43	Create an interface Animal with an abstract method makeSound() and a default method eat(). Then, create a class Dog that implements the interface and overrides the makeSound() method.	CO2
44	Create two interfaces: LandVehicle and WaterVehicle. The LandVehicle interface has a method drive(), and the WaterVehicle interface has a method sail(). Create a class AmphibiousVehicle that implements both interfaces and provides implementations for both drive() and sail().	CO2
45	Create an abstract class Computer with an abstract method process() and a concrete method turnOn(). Also, create an interface Operable with a method operate(). Then, create a class Laptop that implements the Operable interface and extends the Computer class, providing implementations for both process() and operate().	CO3
46	Create an abstract class Employee with a constructor that takes the employee name and salary. Create two subclasses: Manager and Developer that inherit from Employee and provide their own implementation of a method work().	CO3
47	Create an interface Calculator with a static method add(int a, int b) that returns the sum. Then, create a class MathOperations that calls this static method to perform addition.	CO3
48	Create an interface NotificationLogger with default methods logNotification() and logWarning(). Implement the interface in two classes: EmailNotificationLogger and SMSNotificationLogger. Both classes should have their own implementations of logNotification() and logWarning().	CO3
49	Create a package called mathoperations with a class Calculator that has methods for addition, subtraction, multiplication, and division. In a separate class TestCalculator in the package app, import the Calculator class and demonstrate the use of these methods by performing basic operations.	CO3
50	Create a class Employee with private fields name, id, and salary in the package company. Provide getter and setter methods for these fields. In another class EmployeeTest, show how access protection works by trying to access these fields and methods from outside the package.	CO3
51	Create a program that demonstrates the use of a lambda expression to print the square of a given integer.	CO3
52	Create a program that uses a lambda expression to compare two strings and determine if the first string is longer than the second.	CO3
53	Create a program that demonstrates the use of a lambda expression with multiple statements inside the body. The lambda expression should calculate the product of two integers and	CO3

	return the result.	
54	Create a program that demonstrates a lambda expression to find the maximum of two numbers using ternary operator.	CO3
55	Create a program that demonstrates the use of a lambda expression to print each element in an array of integers.	CO3
56	Create a package bank with classes Account and Transaction. The Account class should have methods to deposit and withdraw money, and the Transaction class should log each transaction. In a Main class, demonstrate the use of these classes by performing deposit and withdrawal actions and logging the transactions.	CO3
57	Create a program that demonstrates the use of various methods in the String class such as length(), charAt(), substring(), toUpperCase(), and replace().	CO3
58	Create a program that demonstrates the usage of StringBuffer for string manipulation. Perform operations such as append(), insert(), replace(), delete(), and reverse().	CO3
59	Create a program that demonstrates the performance difference between StringBuffer and StringBuilder in terms of string concatenation. Perform 1,000,000 append operations using both classes and measure the time taken for each.	CO3
60	Create a program that accepts a sentence as input and reverses each word in the sentence using StringBuilder.	CO4
61	Create a program that demonstrates the occurrence and handling of an ArithmeticException when trying to divide by zero.	CO4
62	Create a program that handles an ArrayIndexOutOfBoundsException when trying to access an index outside the bounds of an array.	CO4
63	Create a custom exception called InvalidAgeException. The program should throw this exception if an invalid age (less than or equal to zero) is provided.	CO4
64	Create a program that demonstrates the use of multiple catch blocks to handle different exceptions, such as ArithmeticException and ArrayIndexOutOfBoundsException.	CO4
65	Create a program that demonstrates the use of the finally block in a try-catch-finally structure, ensuring that a message is printed regardless of whether an exception occurs or not.	CO4
66	Create a program that defines a custom exception class InvalidBalanceException. The program should throw this exception if a user attempts to withdraw more money than the balance in a bank account.	CO4
67	Create a program that demonstrates the use of nested try-catch blocks to handle multiple exceptions at different levels.	CO4
68	Create a program that demonstrates the use of multi-catch to handle multiple exceptions in one catch block.	CO4
69	Write a program to create a thread by extending the Thread class and demonstrate its functionality.	CO4
70	Create a thread by implementing the Runnable interface, and demonstrate how to start the thread using the Thread class.	CO4
71	Create a program that demonstrates how to assign thread priorities using the setPriority() method.	CO4
72	Create a program that demonstrates a Daemon Thread and how it behaves when the main thread completes.	CO4
73	Write a program to demonstrate synchronization in threads to avoid race conditions.	CO4
74	Create a program to demonstrate thread communication using wait(), notify(), and notifyAll().	CO4

75	Write a program that uses FileInputStream to read the contents of a binary file and FileOutputStream to write the contents to another binary file.	CO4
76	Write a program that uses BufferedReader to read from a text file and BufferedWriter to write the content to another text file.	CO4
77	Write a program that reads all lines from a source text file using BufferedReader and writes those lines to another text file using BufferedWriter.	CO4
78	Write a program that reads a file and counts the total number of characters in the file using FileReader.	CO4
79	Create a program that uses FileReader to read from a text file and FileWriter to write to another text file.	CO4
80	Write a program that copies a binary file (like an image) from one location to another using FileInputStream and FileOutputStream.	CO4
81	Create a program that demonstrates the use of ArrayList. Perform operations like adding, removing, and accessing elements.	CO4
82	Create a program that demonstrates the use of LinkedList. Perform operations like adding, removing, and accessing elements.	CO5
83	Create a program that demonstrates the use of HashSet. Perform operations like adding, removing, and checking for duplicates.	CO5
84	Create a program that demonstrates the use of HashMap. Perform operations like adding key- value pairs, accessing values, and removing entries.	CO5
85	Write a program to demonstrate the use of Iterator for traversing a List	CO5
86	Write a program to demonstrate the use of Iterator for traversing a Set.	CO5
87	Write a program that demonstrates the use of an Iterator to iterate through a Map's entry set.	CO5
88	Create a program that demonstrates the use of the Stack class. Perform operations like pushing, popping, and checking if the stack is empty.	CO5
89	Create a program that demonstrates the use of a queue implemented with LinkedList. Perform operations like enqueue, dequeue, and checking if the queue is empty.	CO5
90	Create a program that checks whether a string containing parentheses is balanced using a stack. The string contains only characters '(', ')', '{', '}', '[', and ']'.	CO5
91	Create a generic class called Box that can store any type of object. Demonstrate the usage of the generic class by storing different types of objects (e.g., Integer, String) in different Box instances.	CO5
92	Write a generic method print Array that prints the elements of any array. The method should work for arrays of different types (e.g., Integer[], String[], Double[]).	CO5
93	Create a generic class Maximum that finds the maximum of three values. The class should only accept types that extend Comparable so that they can be compared to each other.	CO5
94	Create a generic class Pair that holds two objects of different types. Implement a method getFirst() to return the first element and getSecond() to return the second element.	CO5
	Create a generic Pair class that can hold two objects. Implement a swap method to swap the values of the two objects in the pair.	
96	Create a generic class Item Counter that counts the occurrences of an item in an array. The class should have a method count Occurrences that returns the number of occurrences of a specified item in the array.	CO5
97	Create an Array List of integers. Sort the list in ascending order and descending order, and display the results.	CO5
98	Create an Array List of strings. Add several strings and perform operations such as finding the length of each string, removing a string, and checking if a string exists in the list.	CO5

99	Create an Array List of integers and write a program to check if a specific element exists in the list using the contains() method.	CO5
100	Create an Array List of strings and write a program to update an element at a specific index using the set() method.	CO5
Total Hours: 45 hrs.		

Course Code: CBCA0356				Course Name: Personality Development and Professional Skills				L	T	P	C
Course Offered in: BCA								0	0	2	1
Pre-requisite: Basic understanding and foundational knowledge of general communication skills.											
Course Objectives: After completion of the course, the student will be able to											
The primary objective of this course is to equip students with the essential personal and professional skills required to excel in the modern workplace.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Develop self-awareness, set personal goals, and manage time and stress effectively								K2		
CO2	Communicate effectively, work well in teams, and practice professional etiquette in various settings.								K4		
CO3	Enhance quantitative, logical, and verbal reasoning skills for effective problem-solving and decision-making								K4		
CO4	Create impactful resumes, perform confidently in interviews and group discussions, and develop critical soft skills								K6		
CO5	Apply project management principles, understand financial literacy, and demonstrate ethical behavior and digital professionalism								K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	1	2	2	1	3	2	2	3			
CO2	1	1	1	1	3	1	2	2			
CO3	2	3	2	1	2	1	1	2			
CO4	1	2	2	1	3	1	2	2			
CO5	1	2	3	1	2	3	3	2			
Course Contents / Syllabus											
Unit 1		Foundations of Personal Development								03 hours	
Self-Awareness and Self-Improvement, Self-Assessment Tools: Myers-Briggs Type Indicator (MBTI), StrengthsFinder. Goal Setting: SMART Goals, Personal Development Plans. Time Management: Prioritization, Scheduling, Avoiding Procrastination. Stress Management: Techniques for Managing Stress, Mindfulness, and Relaxation Exercises. Communication Skills: Verbal Communication: Public Speaking, Group Discussions, Debating. Non-Verbal Communication: Body Language, Eye Contact, Gestures. Listening Skills: Active Listening, Feedback Techniques. Presentation Skills: Creating Effective Presentations, Using Visual Aids, Storytelling											
Unit 2		Interpersonal and Professional Skills								03 hours	
Interpersonal Skills, Teamwork: Role of a Team Player, Group Dynamics, Conflict Resolution, Leadership Skills: Leadership Styles, Motivating Team Members, Decision Making. Networking Skills: Building Professional Relationships, Networking Strategies, Use of Social Media, Professional Etiquette, Corporate Etiquette: Professional, Behavior, Office Etiquette, Business Meetings. Email Etiquette: Professional Email Writing, Common Mistakes to Avoid. Telephone Etiquette: Handling Professional Calls, Voicemail Etiquette. Dining Etiquette: Business Dining Rules, Table Manners.											
Unit 3		Aptitude & logical Reasoning								03 hours	
Aptitude Skills, Quantitative Aptitude: Basic Mathematics, Data Interpretation. Logical Reasoning: Analytical Puzzles, Logical Deductions. Verbal Ability: Grammar, Vocabulary, Reading Comprehension											
Unit 4		Career Readiness and Interview Preparation								03 hours	
Interview Preparation, Resume Writing: Crafting an Effective Resume, Cover Letter Writing. Mock Interviews: HR Round, Technical Round, Stress Interviews. Group Discussions: Techniques to Excel, Common Topics, Role of a Moderator, Personal Interview Tips: Dressing for Success, Answering Common Questions, Handling Unexpected Questions, Soft Skills Development, Creativity and Innovation: Brainstorming Techniques, Creative Problem Solving. Emotional Intelligence: Understanding Emotions, Empathy, Handling Relationships. Adaptability and Flexibility: Coping with Change, Learning Agility. Critical Thinking: Evaluating Information, Problem-Solving Strategies											
Unit 5		Practical Workplace skills & Ethics								03 hours	

Digital Literacy and Online Presence, Professional Use of Social Media: LinkedIn Profile Optimization, Building an Online Portfolio. **Cyber Etiquette:** Safe Online Practices, Digital Footprint Management. **Blogging and Content Creation:** Writing for the Web, Creating Engaging Content, **Workplace Skills, Project Management:** Basics of Project Management, Tools like MS Project, Agile Methodology. **Time and Task Management Tools:** Using Tools like Trello, Asana, and Calendar Apps. **Financial Literacy:** Basic Financial Planning, Understanding Salaries, Taxes, **Ethics and Values, Workplace Ethics:** Integrity, Accountability, Professional Conduct. **Diversity and Inclusion:** Understanding Diversity, Promoting Inclusivity, **Corporate Social Responsibility (CSR):** Understanding CSR, Participating in CSR Activities

Total Lecture Hours | **15 hours**

Textbook:

- | | |
|--|-------------------|
| 1. The 7 Habits of Highly Effective People", | Stephen R. Covey |
| 2. A Modern Approach to Verbal & Non-Verbal Reasoning" | Dr. R.S. Aggarwal |

Reference Books:

- | | |
|--|---------------|
| 1. How to Win Friends & Influence People | Dale Carnegie |
|--|---------------|

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	NPTEL Soft Skills – https://nptel.ac.in	12 hrs
Video Lectures	Josh Talks – https://www.youtube.com/@JoshTalks	10 hrs
Web References	MindTools – https://www.mindtools.com	

LAB Course Code: CBCA0311P			LAB Course Name: Artificial Intelligence Lab			L	T	P	C
Course Offered in: BCA						0	0	2	1
Pre-requisite: Knowledge of Python									
Course Objectives:									
Introductory knowledge of the historical perspective of AI and its foundations, and familiarity with principles of AI toward problem solving, inference, perception, knowledge representation, and learning. Acquiring knowledge of various forms of learning and computational statistics.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Apply searching problems using various algorithms. Explain functionality of Chat-bot.								K3
CO2	Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.								K1
CO3	Implement the program to POS (Parts of Speech) tagging for the give sentence using NLTK.								K3
CO4	Design and carry out an empirical evaluation of different algorithms on a problem formalization and state the conclusions that the evaluation supports.								K3
CO5	Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).								K3
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	2	3	1	-	1	2	
CO2	3	3	2	2	2	-	1	2	
CO3	3	2	2	3	1	-	-	2	
CO4	3	3	3	3	2	1	1	3	
CO5	3	2	3	3	1	-	1	2	
List Of Practical's (Indicative & Not Limited To)									CO
1.	Write a python program to implement simple Chat-bot								CO1
2.	Implement Tic-Tac-Toe using A* algorithm.								CO1
3.	Implement alpha-beta pruning graphically with proper example and justify the pruning.								CO1
4.	Write a python program to implement Water Jug Problem.								CO2
5.	Use Heuristic Search Techniques to Implement Best first search (Best-Solution but not always optimal) and A* algorithm (Always gives optimal solution).								CO2
6.	Write a program to implement Hangman game using python.								CO2
7.	Write a program to solve the Monkey Banana problem								CO3
8.	Write a python program to implement Simple Calculator program.								CO3
9.	Write a python program to POS (Parts of Speech) tagging for the give sentence using NLTK								CO3
10.	Solve 8-puzzle problem using best first search								CO4
11.	Solve Robot (traversal) problem using means End Analysis.								CO4
12.	Implementation of Image features Processing using OPENCV AND OPEN VINO								CO4
13.	Write a program to implement Naïve Bayes Algorithm								CO5
14.	Use Heuristic Search Techniques to Implement Hill-Climbing Algorithm								CO5
15.	Write a Program to implement alpha-beta Pruning.								CO5
Total Hours: 15 hrs.									

LAB Course Code: CBCA0312P			LAB Course Name: Canva & Corel Draw Lab			L	T	P	C
Course Offered in: BCA						0	0	2	1
Pre-requisite: Basic computer skills, internet access, and a creative mindset.									
Course Objectives:									
The lab aims to develop proficiency in graphic design, branding, and digital content creation using Canva and CorelDRAW, focusing on creative design, vector graphics, marketing materials, and professional portfolio development for industry readiness.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Learn design concepts, color theory, typography, and layout principles.								K2
CO2	Use Canva tools for creating social media posts, presentations, and animations.								K3
CO3	Create and manipulate vector graphics, logos, and layouts using CorelDRAW.								K4
CO4	Develop high-quality branding and marketing materials using advanced design techniques.								K5
CO5	Design a complete portfolio showcasing real-world projects for career advancement.								K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	1	2	-	-	-	2	
CO2	3	2	2	3	2	-	-	3	
CO3	3	3	3	3	2	-	-	3	
CO4	3	3	3	3	2	-	-	3	
CO5	3	2	3	3	3	-	-	3	
List Of Practical's (Indicative & Not Limited To)									CO
S.No.	List of Experiment/Program								CO
1.	Exploring Canva & Basic Graphic Design – Discuss Canva's interface, tools, and basic design principles								CO1
2.	Designing a Social Media Post – Create a social media post for Instagram or Facebook using Canva.								CO1
3.	Poster Design for Event Promotion – Create an attractive event poster using Canva's templates and elements								CO1
4.	Infographic Design for Data Visualization – Design an infographic using Canva's charts and icons.								CO2
5.	UI/UX Wireframe Design in Canva – Create a low-fidelity UI wireframe for a website or mobile app.								CO2
6.	Exploring CorelDRAW & Basic Vector Drawing – Learn CorelDRAW's interface and create simple vector illustrations.								CO2
7.	Logo Design in CorelDRAW – Create a professional logo using vector tools and typography.								CO3
8.	Business Card Design in CorelDRAW – Design a business card with branding elements and text effects.								CO3
9.	Brochure Design (Tri-fold or Bi-fold) – Create a well-structured brochure for marketing purposes.								CO3
10.	Banner Design for Digital & Print Media – Design a marketing banner for both online and print use.								CO4
11	Product Packaging Label Design – Design a packaging label with branding, typography, and color themes.								CO4
12	Certificate & Invitation Card Design – Create an official certificate or invitation card using CorelDRAW.								CO4
13	Animated Video Creation in Canva – Create an animated video using Canva's timeline and animation tools.								CO5
14	Digital Portfolio Design Using Canva & CorelDRAW – Create a digital portfolio showcasing completed projects.								CO5
15	Final Project: Branding Kit (Logo, Business Card, Brochure, Social Media Posts) – Apply all learned skills to design a complete branding package.								CO5
Total Hours: 15 hrs.									

LAB Course Code: CBCA0313P				LAB Course Name: CRM Fundamentals Lab				L	T	P	C
Course Offered in: BCA								0	0	2	1
Pre-requisite: Basic knowledge of Computer and Programming Language.											
Course Objectives:											
The objective of this course is to develop a comprehensive understanding of CRM fundamentals, including lifecycle management, stakeholder mapping, and strategy development. It covers CLV calculation, data collection, and planning using various CRM platforms. The course also focuses on Salesforce proficiency, including login, account management, profile creation, and field-level security configuration.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Describe the CRM lifecycle and stakeholder mapping to enhance customer relationships.									K2	
CO2	Apply CRM strategies, including CLV calculation and employee-customer relationship factors									K2	
CO3	Demonstrate CRM data collection, planning, and various platforms to achieve desired business outcomes									K3	
CO4	Demonstrate proficiency in Salesforce for login, account, and contact management.									K3	
CO5	Demonstrate skills in creating profiles and configuring field-level security in Salesforce.									K3	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	2	3	2	2	2	2	1	2			
CO2	2	3	3	2	2	3	1	2			
CO3	2	3	3	3	2	3	1	3			
CO4	2	2	3	3	1	2	1	3			
CO5	2	2	3	3	1	2	3	3			
List Of Practical's (Indicative & Not Limited To)										CO	
S.No.	List of Experiment/Program									CO	
1.	CRM Life Cycle Analysis.									CO1	
2.	Stakeholder Mapping in CRM.									CO1	
3.	Customer Lifetime Value (CLV) Calculation									CO2	
4.	Factors Affecting Employee-Customer Relationship.									CO2	
5.	CRM Strategy Development.									CO2	
6.	CRM Data Collection and Analysis.									CO3	
7.	CRM Planning with Desired Outputs.									CO3	
8.	Introduction to Various CRM Platform.									CO3	
9.	Write a Steps to Log in to Trailhead.									CO4	
10.	Write the steps to create an account named 'Josh' on the Account object.									CO4	
11	Write the steps to create an contact named 'Alexjander' on the Contact object.									CO4	
12	Write the steps to create a new profile on trailhead account.									CO5	
13	Write a step Configuring Field-Level Security in Salesforce									CO5	
Total Hours: 15 hrs											

Course Code: CBCA0401				Course Name: Cognitive Ability				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic understanding of elementary mathematics											
Course Objectives: After completion of the course, the student will be able to											
The objective of this course is to develop students' quantitative aptitude and logical reasoning skills through number theory, analytical puzzles, and business mathematics, enabling them to solve real-world and competitive exam problems with speed, accuracy, and logical thinking.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy			
CO1	Apply fundamental number theory concepts such as divisibility, HCF & LCM, remainder theorem, and cyclicity to solve quantitative problems efficiently.							K2, K3			
CO2	Solve problems involving logical reasoning and analytical thinking, including direction sense, blood relations, series patterns, and time-based puzzles like clocks and calendars.							K3			
CO3	Solve problems involving Percentage, Ratio, Proportion, Partnership, Problem of ages and coding decoding.							K2, K3			
CO4	Solve real-life business math problems involving percentages, profit and loss, discounts, interest calculations, averages, mixtures, and ratios using appropriate mathematical methods							K2, K3			
CO5	Solve quantitative aptitude problems involving time and work, wages, pipes and cisterns, speed-distance-time, and race-related scenarios, using mathematical formulas and real-world applications.							K2,K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	1	1	1	1	-	-	-	-			
CO2	1	1	1	1	-	-	-	-			
CO3	1	1	1	1	-	-	-	-			
CO4	1	1	1	1	-	-	-	-			
CO5	1	1	1	1	-	-	-	-			
Course Contents / Syllabus											
Unit 1		Speed Math and Basic Number System							09 hours		
Classification of number, Divisibility Rule, Factors, Factorization, HCF & LCM, It's Application, Direction and Sense											
Unit 2		Advance Number System and Logical Reasoning							09 hours		
Unit digits, Last two digits, Remainder Theorem, Trailing zero's, Highest power, Blood Relation, Number Series and Letter Series											
Unit 3		Business Math and Logical Reasoning-I							09 hours		
Alpha numeric series, Coding Decoding, Percentage, Ratio and Proportion, Partnership, Problem of ages											
Unit 4		Business Math and Logical Reasoning - II							09 hours		
Profit and Loss, Discount, Simple Interest and Compound Interest, Clock and Calendar											
Unit 5		Arithmetic							09 hours		
Average , Mixture & Allegation, Time and Work, Pipe and Cistern, Time speed and distance, Boat and Stream											
								Total Lecture Hours		45 hours	
Reference Books:											
1. Quicker Maths (2021). <i>Quicker Maths</i> . New Delhi: BSC Publishing Co. Pvt. Ltd.						Tyra, M.					
2. Quantitative Aptitude for Competitive Examinations (2024). <i>Quantitative Aptitude for Competitive Examinations</i> (Revised ed.). New Delhi: S.						Aggarwal, R. S.					
3. A Modern Approach to Verbal & Non-Verbal Reasoning (Latest Edition). <i>A Modern Approach to Verbal & Non-Verbal Reasoning</i> . New Delhi: S. Chand Publishing.						Aggarwal, R. S.					

4. Quantum CAT (Latest Edition). <i>Quantum CAT: Quantitative Aptitude for CAT and Other MBA Entrance Examinations</i> . New Delhi: Arihant Publications.		Verma, S. K.
Self-Study Content Links:		Duration (in Hrs)
MOOCs	NPTEL Soft Skills & Cognitive Development – https://nptel.ac.in	15 hrs
Video Lectures	Unacademy Logical Reasoning Playlist – https://www.youtube.com/@Unacademy	10 hrs
Web References	GeeksforGeeks Aptitude Preparation – https://www.geeksforgeeks.org/aptitude-gq	

Course Code: CBCA0402				Course Name: Database Management System				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic understanding of computer concepts.											
Course Objectives: After completion of the course, the student will be able to											
To introduce relational and non-relational databases with emphasis on how to create, organize and retrieve information											
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy			
CO1	Design ER diagram of database for solving the real-world problems.							K5			
CO2	Analyze the Structured Query Language (SQL) to solve queries							K3			
CO3	Describe Relational Data Model and explain the concept of functional dependencies and Normalization.							K2			
CO4	Analyze transaction and concurrency control in transaction management.							K2			
CO5	Design and implement relational and non-relational database for the need of the real-world project.							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	2	2	2	1	2	1	1	1			
CO2	2	3	3	2	2	2	1	2			
CO3	3	3	3	2	3	2	2	2			
CO4	2	2	3	3	2	2	2	1			
CO5	3	2	3	3	3	2	2	2			
Course Contents / Syllabus											
Unit 1		Introduction of Database & Conceptual Designing								09 hours	
Definition of Data, Database, and DBMS, Overview of Database Applications, Advantages and Disadvantages of DBMS, Roles of Database Users and Administrators. Introduction to Data Models, Types of Database Models (Hierarchical, Network, Relational, Object-oriented). Data Models, Schemas, and Instances, Three-schema Architecture and Data Independence. Keys: Primary Key, Candidate Key, Super Key, Foreign Key, Composite Key, Alternate Key, Unique Key, Constraints in a table: Primary Key, Foreign Key, Unique Key, NOT NULL, CHECK, Entity-Relationship (ER) Model, Entities and Entity Sets, Attributes and Relationships, ER Diagrams and Weak Entity Sets.											
Unit 2		Relational Data Model & Basic of SQL								09 hours	
Domains, attributes, Tuples and Relations. Relational Constraints – Domain constraint, key constraint, primary key constraint, referential integrity constraint. SQL Basics: DDL and DML, Aggregate Functions (Min (), Max(), Sum(), Avg(), Count()), Logical operators (AND, OR NOT), Predicates (Like, Between, Alias, Distinct), Clauses(Group By, Having, Order by, top/limit), Inner Join, Natural Join, Full Outer Join, Left Outer Join, Right outer Join, Equi Join.											
Unit 3		Normalization & Database Design								09 hours	
Anomalies in a database, Functional Dependencies: Armstrong's Axioms, Definition, Properties (Reflexivity, Augmentation, Transitivity), Types (Trivial, Non-Trivial, Partial and Full Functional Dependency), Closure of Functional Dependencies, Normal Forms (1NF, 2NF, 3NF).											
Unit 4		Transaction & Concurrency control								09 hours	
ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control, Performance of Locking, 2 Phase Locking Protocol, Serializability, and Recoverability, Dealing with Deadlocks.											
Unit 5		Introduction of No SQL								09 hours	
Introduction to NoSQL, Data Models: Document, Key value, Column family, Graph. Uses and Features of NO/SQL document databases. CAP theorem, BASE vs ACID, CRUD operations.											
Total Lecture Hours								45 hours			
Textbook:											
1. Database System Concepts, Seventh Edition, McGraw - Hill.(2019)								Korth, Silbertz, Sudarshan			

2.—An Introduction to Database Systems, Eighth Edition, Pearson, (2004)		C J Date
Reference Books:		
1.—Database Systems: A Practical Approach to Design, Implementation and Management, Third Edition, Pearson Education, (2007)	Thomas Cannolly and Carolyn Begg	
2. —Database Management Systems, Third Edition, McGraw-Hill (2002)	Raghu Ramakrishnan and Johannes Gehrke	
Self-Study Content Links:		Duration (in Hrs)
MOOCs	NPTEL DBMS – https://nptel.ac.in/courses/106106093	10 hrs
Video Lectures	Neso Academy DBMS – https://www.youtube.com/@nesoacademy	12 hrs
Web References	TutorialsPoint DBMS – https://www.tutorialspoint.com/dbms	8 hrs

Course Code: CBCA0403				Course Name: Digital Marketing				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Students should be able to think creatively.											
Course Objectives: After completion of the course, the student will be able to											
To acquaint the students with the growing integration between traditional and digital marketing concepts and practices in the digital era.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the concept of digital marketing and how it integrates with traditional marketing.							K2			
CO2	Recognize the marketers use Google SEO projects to influence purchasing and selling decisions on digital platforms using digital content and tools.							K1			
CO3	Analyze the benefits of integrating traditional and digital marketing with Google SEO for sales and purchasing marketing strategies.							K3			
CO4	Examine the effectiveness of email, content, and social media marketing strategies in digital media campaigns."							K3			
CO5	Implement digital marketing strategies to enhance business growth and career opportunities.							K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	2	2	1	1	1	-	-	1			
CO2	2	3	2	3	-	-	-	2			
CO3	2	3	3	2	1	-	-	-			
CO4	2	2	3	3	1	-	1	2			
CO5	1	2	3	2	2	2	1	3			
Course Contents / Syllabus											
Unit 1		Introduction to Digital Marketing							09 hours		
The new digital world, trends driving shifts from traditional marketing practices to digital marketing practices, the modern digital consumer, and the new consumer's digital journey. Marketing strategies for the digital world—the latest practices.											
Unit 2		Social Content Strategy							09 hours		
Social Content Strategy: Content Seeding, Social Media Formats, Content Promotion, Content Optimization, Influencer Marketing, Word of Mouth Marketing, Measurement and Tracking, Content Promotion Strategy, Audience Segmentation.											
Unit 3		Social Content Promotion							09 hours		
Facebook Marketing Fundamentals: Introduction to Facebook, The Value to Marketers, Page Management, Facebook Live, Messenger Facebook Ads and Marketing: Facebook Ads, Ads Manager, Strategy Process, Buying Channels and Ad Auctions											
Unit 4		SEO and Current Scenario in Social Media							09 hours		
Overview of search engine optimization (SEO), search engine marketing, mobile marketing, video marketing, Understanding the relationship between content and branding and its impact on sales, Online campaign management, Understanding trends in social media marketing – Indian and global context.											
Unit 5		SEM and Display Advertising							09 hours		
Search Engine Marketing (SEM), Keywords, On-Site SEO: optimize UX & Design, off-Site SEO: Link-building. programmatic & Display Advertising, Search Engine Marketing with Google Ads (SEM), Keyword Selection, create Taxi Ads, CPC Bidding. Navigate Google Ads, SEM Metrics & optimization, Jobs in SEM, Display Advertising, Display AJs & Targeting, Sales Models, Display Ads in google Ads, video Advertising, Jobs in Display Advertising. Email Marketing. find the module name.											
Total Lecture Hours									45 hours		
Textbook:											
1.Fundamentals of Digital Marketing (2nd Edition),2019									Puneet Bhatia		
2.The Ultimate Guide for Website Owners. BUUKS 1st Edition 2019									Deepak Bansal		

Reference Books:		
1.The art of digital marketing: the definitive guide to creating strategic, targeted, and measurable online campaigns.		John Wiley & Sons.(2016). Dodson, I.
2.Marketing 4.0: Moving from traditional to digital. John Wiley & Sons.1st Edition 2016		Kartajaya, I., Kotler, P., & Setiawan
Self-Study Content Links:		Duration (in Hrs)
MOOCs	Google Digital Garage – https://learndigital.withgoogle.com	8 hrs
Video Lectures	Neil Patel – https://www.youtube.com/@NeilPatel	10 hrs
Web References	Moz Blog – https://moz.com/blog	11 hrs

Course Code: CBCA0404				Course Name: Data Science				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basics of Mathematics and Computer Knowledge											
Course Objectives: After completion of the course, the student will be able to											
A data science course aims to equip students with the skills to analyse, interpret, and communicate data effectively, enabling them to extract insights and make data-driven decisions across various fields											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describe the process and components of Data Science.								K2		
CO2	Discuss the importance of probability and statistics in Data Science								K2		
CO3	Demonstrate knowledge of statistical data analysis techniques utilized in business decision making								K4		
CO4	Acquire the knowledge of different machine learning techniques.								K3		
CO5	Analyze the key elements, methods, and success factors of Data Science projects.								K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	3	2	1	1	1	3			
CO2	3	2	2	2	1	1	1	3			
CO3	3	2	2	2	1	1	1	3			
CO4	3	2	2	2	1	1	1	3			
CO5	3	2	3	2	1	1	1	3			
Course Contents / Syllabus											
Unit 1		Data Science - An Overview							09 hours		
Introduction to Data Science: Definition and description, history and development, terminologies, basic framework and architecture, difference between Data Science and business analytics, importance of Data Science, primary components of Data Science, users of Data Science and its hierarchy. Overview of Data Science techniques: challenges and opportunities in Data Science, industrial application of Data Science techniques.											
Unit 2		Mathematics and Statistics in Data Science							09 hours		
Role of mathematics & statistical measures: Descriptive, Predictive, and prescriptive statistics, introduction to statistical inference, application of statistical techniques Linear algebra: Matrix and vector theory, role of linear algebra in Data Science, exploratory data analysis and visualization techniques, difference between exploratory and descriptive statistics.											
Unit 3		Represent And Transform Data And Data Modelling							09 hours		
Statistics and Representation Techniques: Understand Data Transformation, Represent and Transform unstructured data, Data Transformation Tools, Decision-centred visualization. Fundamentals of Visualization: Common graphs, Common tools, understand the popular open source data science frameworks. Understand modelling and Machine Learning techniques, Accuracy Precision & recall.											
Unit 4		Machine Learning in Data Science							09 hours		
Role of machine learning, different types of machine learning techniques: Supervised, unsupervised, reinforcement and deep learning, difference between different machine learning techniques, machine learning algorithms, difference between classification and prediction. About Machine learning techniques: Regression to neural networks, Decision tree classifier, Machine learning Framework, Auto insurance Fraud Analyzed in Jupyter Notebooks.											
Unit 5		Data Science Project Management							09 hours		
Data Science project framework: Execution flow of a Data Science project, various components of Data Science projects, stakeholders of Data Science project, industry use cases of Data Science implementation, challenges and scope of Data Science project management, process evaluation model, comparison of Data Science project methods, improvement in success of Data Science project models.											

		Total Lecture Hours	45 hours
Textbook:			
1. Data Science from Scratch: First Principles with Python, : O'Reilly Media 2 nd Edition 2019		Joel Grus	
1. Principles of Data Science, Packt Publishing 3rd Edition 2023		Sinan Ozdemir	
Reference Books:			
1.Data Science For Dummies, Wiley 3rd Edition 2021		Lillian Pierson	
2.Data Science for Business: What You Need to Know about Data Mining and Data- Analytic Thinking, O'Reilly Media 1st Edition 2013		Foster Provost, Tom Fawcett	
Self-Study Content Links:		Duration (in Hrs)	
MOOCs	NPTEL Data Science for Engineers – https://nptel.ac.in/courses/10610617	12 hrs	
Video Lectures	Krish Naik Data Science Playlist – https://www.youtube.com/@krishnaik06	13 hrs	
Web References	GeeksforGeeks Data Science Tutorial – https://www.geeksforgeeks.org/data-science-for-beginners		

Course Code: CBCA0411				Course Name: Image Editing with Photoshop				L	T	P	C	
Course Offered in: BCA								3	0	0	3	
Pre-requisite: Basic Computer Skills												
Course Objectives: After completion of the course, the student will be able to												
To introduce the fundamentals of Adobe Photoshop and digital imaging.To develop practical skills in photo manipulation, typography, and graphic design. To prepare students for roles in media, business, and creative industries through digital content creation												
Course Outcome: After completion of the course, the student will be able to									Bloom’s Taxonomy			
CO1	Understand and navigate the Photoshop interface, tools, and workspace customization.								K2			
CO2	Apply image editing techniques and use typography tools for design elements.								K3			
CO3	Understand the difference between supervised and unsupervised learning.								K4			
CO4	Apply creative effects and compile a professional digital portfolio.								K5			
CO5	Use Photoshop automation tools and integrate with Adobe Creative Cloud for enhanced productivity								K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8				
CO1	3	2	1	-	-	-	-	-				
CO2	3	3	2	2	-	-	-	-				
CO3	3	3	3	3	-	-	-	-				
CO4	2	2	3	3	-	-	-	-				
CO5	2	3	3	3	-	-	-	-				
Course Contents / Syllabus												
Unit 1		Introduction to Photoshop & Selections								09 hours		
Overview of Photoshop interface and workspace, customizing panels and tools, understanding files formats and resolution, Basic navigation: zoom, pan, rulers, and guides, Working with layers and selections (Marquee, Lasso, Quick Selection, Magic Wand)												
Unit 2		Image Editing & Typography								09 hours		
Color correction (Brightness, Contrast, Levels, and Curves), Retouching tools: Clone Stamp, Healing Brush, Patch Tool, Content-Aware Fill and Liquefy tool, Typography and text effects, Layer styles and blending modes												
Unit 3		Advanced Compositing & Web Design								09 hours		
Smart Objects and Smart Filters, Double exposure and surreal effects, Photo compositing and blending, designing graphics for web and social media, Exporting images for different platforms												
Unit 4		Special Effects & Final Project								09 hours		
Applying artistic filters and effects, creating lighting and shadow effects, Digital painting and brush techniques, assembling a digital portfolio, Presenting and critiquing work.												
Unit 5		Automation & Workflow Efficiency								09 hours		
Using Photoshop Actions to automate repetitive tasks, Batch processing and scripts for workflow optimization, Customizing Photoshop with plug-in and extensions, Integration with other Adobe Creative Cloud applications, Best practices for file organization and version control.												
										Total Lecture Hours		45 hours
Textbook:												
1. Adobe Photoshop Classroom in a Book (latest edition), Adobe Press 1st Edition 2024												
2 .Adobe Photoshop CS4 Bible, Wiley 1st Edition 2009 Stacy Cates,										Simon Abrams, Dan Moughamian		
Reference Books:												

1. Photoshop(R) 7: The Complete Reference

Fuller Laurie

Self-Study Content Links:

Duration
(in Hrs)

MOOCs

Adobe Photoshop Tutorials – <https://helpx.adobe.com/photoshop/tutorials.html>

15 hrs

Video Lectures

<https://www.adobe.com/learn/photoshop/web/photo-editor>

10 hrs

Web References

GFXMentor Photoshop Course – <https://www.youtube.com/@GFXMentor>

5 hrs

Course Code: CBCA0412				Course Name: CRM Administration				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Creative thinking and which is being used by the creative talent in your business areas.											
Course Objectives: After completion of the course, the student will be able to											
Understand the concepts of Sales force App. Understand the concepts of Lightning Experience. Familiarize with concepts administration. Learn Admin Essentials in Lightning Experience											
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy			
CO1	Describe the basic working environment of Salesforce							K2			
CO2	Discuss the concepts of Lightning & Salesforce App Experience Customization							K2			
CO3	Describe the concepts of reports chatter administration							K3			
CO4	Discuss the concepts of Lightning Experience							K2			
CO5	Describe Admin Essentials in Lightning Experience							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	3	1	-	-	2			
CO2	3	2	2	3	2	1	-	2			
CO3	2	3	3	3	2	2	1	3			
CO4	3	2	2	3	2	1	1	2			
CO5	3	3	3	3	2	2	1	3			
Course Contents / Syllabus											
Unit 1		Introduction							09 hours		
Sales force Platform Basics, User Management, Data Modeling ,Data Management, Identity Basic , Data Security ,Lightning Experience Customization, Lightning APP Builder Sales force Mobile App Customization, User Engagement , Formulas and Validation, Data Security, Pick list Administration.											
Unit 2		Lightning & Sales force App Experience Customization							09 hours		
Formula and Validation, Accounts and Contacts for Lightning Experience, Lead and Opportunity for Lightning Experience, Product Quotes and Contracts, Campaign Basic.											
Unit 3		Sales force Administration							09 hours		
Service Cloud for lightning Experience, Sales force mobile app customization, App Exchange basic Duplicate Management Lightning Experience for Sales force Classic Users, Chatter Administration for Lightning Experience, Reports and Dashboards for lightning experience, Lightning experience customization, Lightning experience rollout , Sales force flow, Lightning experience report dashboard Specialist.											
Unit 4		Lightning Experience							09 hours		
Prepare Sales force Org for Users, Customize an Org to Support a New Business Unit, protect data in Sales force, Customize a Sales Path for team, Customize a Sales force Object, Import and Export with Data Management Tools.											
Unit 5		Learn Admin Essentials in Lightning Experience							09 hours		
Learn about the custom object and custom field in Salesforce Lightning, uses of Custom Object and Custom field in Lightning, Workflow in Lightning, Update Record Field using Workflow, Send Email alert using Workflow, Data Loader in Salesforce Lightning											
									Total Lecture Hours		
									45 hours		
Textbook:											
1Digital Marketing for Dummies,Publisher:								John Wiley & Sons,Inc Ryan Deiss& Russ Henneberry			
2Youtility,, Publisher: Gildan Media, LLC								Jay Baer			
Reference Books:											

1 Salesforce CRM Administration Handbook: A comprehensive guide to administering, configuring, and customizing Salesforce CRM Paperback –30 April 2024, : Packt Publishing 1st Edition		Krzysztof Nowacki, Mateusz Twarożek
2 Mastering Salesforce CRM Administration (English, Electronic book text, Gupta Rakesh)ISBN: 9781786463180, 9781786463180, : Packt Publishing 1st Edition,2017		Rakesh Gupta
Self-Study Content Links:		Duration (in Hrs)
MOOCs	Salesforce Trailhead Administrator Career Path – https://trailhead.salesforce.com/en/career-path/admin	15 hrs
Video Lectures	Salesforce Hulk CRM Administration Playlist – https://www.youtube.com/@SalesforceHulk	10 hrs
Web References	Salesforce Administrator Documentation – https://help.salesforce.com/s/articleView?id=sf.admin.htm	5 hrs

Course Code: CBCA0413				Course Name: Machine Learning				L	T	P	C
Course Offered in: BCA								3	0	0	3
Pre-requisite: Basic Knowledge of Artificial Intelligence											
Course Objectives: After completion of the course, the student will be able to											
To introduce fundamental concepts in machine learning and popular machine learning algorithms. To understand the standard and most popular supervised learning algorithm.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Describing the utilization and implementation of the proper machine learning algorithm.										K2
CO2	Discuss the basic supervised machine learning algorithms.										K2
CO3	Differentiate between supervised and unsupervised learning.										K4
CO4	Discuss algorithmic topics of machine learning and be mathematically deep enough to introduce the require theory.										K2
CO5	Apply appreciation for what is involved in learning from data.										K3
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	1	-	1	2			
CO2	3	2	2	3	-	-	-	2			
CO3	3	2	2	2	-	-	-	2			
CO4	3	3	2	3	-	-	-	2			
CO5	3	3	3	2	1	1	1	3			
Course Contents / Syllabus											
Unit 1		Speed Math and Basic Number System								09 hours	
Learning, Types of Learning, well defined learning problems, designing a Learning System, History of ML, Introduction of Machine Learning Approaches, Introduction to Model Building, Sensitivity Analysis, Underfitting and Overfitting, Bias and Variance, Concept Learning Task, Find – S Algorithms, Version Space and Candidate Elimination Algorithm, Inductive Bias, Issues in Machine Learning and Data Science Vs Machine Learning.											
Unit 2		Advance Number System and Logical Reasoning								09 hours	
Classification and Regression, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression, Polynomial Regression, Decision Trees: ID3, C4.5, CART. Apriori Algorithm: Market basket analysis, Association Rules. Neural Networks: Introduction, Perceptron, Multilayer Perceptron, Support Vector Machine.											
Unit 3		Business Math and Logical Reasoning-I								09 hours	
Introduction to clustering, K-means clustering, K-Nearest Neighbor, Iterative distance-based clustering, Dealing with continuous, categorical values in K-Means, Hierarchical: AGNES, DIANA, Partitional: K-means clustering, K-Mode Clustering, density-based clustering, Expectation Maximization, Gaussian Mixture Models.											
Unit 4		Business Math and Logical Reasoning - II								09 hours	
Bayesian Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief Networks. Ensembles methods: Bagging & boosting, C5.0 boosting, Random Forest, Gradient Boosting Machines and XGBoost.											
Unit 5		Arithmetic								09 hours	
Reinforcement Learning: Introduction to Reinforcement Learning, Learning Task, Example of Reinforcement Learning in Practice, Learning Models for Reinforcement – (Markov Decision Process, Q Learning – Q Learning function, Q-Learning Algorithm), Application of Reinforcement Learning. Case Study: Health Care, E Commerce, Smart Cities.											
Total Lecture Hours										45 hours	
Textbook:											

1. Machine Learning: A Constraint-Based Approach, : Morgan Kaufmann 2 nd Edition 2023		Marco Gori
2. Machine Learning, McGraw-Hill 1st Edition 1997 Tom		M. Mitchell
Reference Books		
1. Machine Learning: An Artificial Intelligence Approach, Springer 1st edition 1993		Ryszard, S., Michalski, J. G. Carbonell and Tom M. Mitchell
2. Machine Learning: An Algorithmic Perspective, CRC Press 2nd Edition 2014 Stephen Marsland 4 Quantitative Aptitude - Quantum CAT		Sarvesh K Verma
Self-Study Content Links:		Duration (in Hrs)
MOOCs	NPTEL Introduction to Machine Learning – https://nptel.ac.in/courses/106106139	15 hrs
Video Lectures	Krish Naik Machine Learning Playlist – https://www.youtube.com/@krishnaik0	10 hrs 6
Web References	Scikit-Learn Documentation – https://scikit-learn.org/stable	5 hrs

LAB Course Code: CBCA0452			LAB Course Name: : Database Management System Lab				L	T	P	C
Course Offered in: BCA							0	0	2	1
Pre-requisite:Basic Programming Techniques.										
Course Objectives:										
To introduce relational and non-relational databases with emphasis on how to create, organize and retrieve information										
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy
CO1	Design ER diagram of database for solving the real-world problems.									K5
CO2	Design a database and put restrictions using Structured Query Language (SQL).									K3
CO3	Implement DML commands and aggregate functions using SQL									K3
CO4	Develop queries on joins, clauses and logical operators using SQL									K3
CO5	Implement NoSQL queries using MongoDB.									K3
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	1	3	2	3	1	1	1	1		
CO2	3	3	3	3	1	1	1	1		
CO3	3	3	3	3	1	1	1	1		
CO4	3	3	3	3	1	1	1	1		
CO5	3	3	3	3	1	1	1	1		

S.No.	List of Experiment/Program	CO
1.	Creating ER Diagram for a Library Management System. Library databases have entities like books, students, staff and reports. Also implement the relationship and cardinalities between the entities with their relevant attribute	CO1
2.	Design an ER diagram for a Banking Management Systems. Bank includes entities such as customers, accounts, branch and loan. Also implement the relationship and cardinalities between the entities with their relevant attribute	CO1
3.	Data Definition Language Queries: Create Tables TEACHER, SUBJECT, TEACHES. TEACHER(Teacherid, Name, dept, salary, dob, Address, phoneno) SUBJECT(subjectcode, subname, credit, marks, subtype) TEACHES(teacherid, subjectcode, class) a) Add a new attribute specialization in teacher table b) Remove attribute address from teacher table c) Modify the data type of phone no attribute d) Change the name of attribute dob to date of birth e) Change a table's name teacher to teach f) Use truncate to delete the contents of teaches table g) Remove subject table from database	CO2
4.	Data Manipulation Language Queries a) Insert at least 10 records in table teacher, subject and teaches b) Show the contents in tables teacher, subject and teaches	CO2

	c) Find the name and dept of all teachers d) Find the name and teacherid of all teachers who stay in _Delhi' e) Find all distinct departments of all teachers f) Delete the record of the teacher whose teacherid is 4001 g) Delete all records of teacher table h) Delete all records of teachers whose section starts with capital A. i) Find the teacher names which have _al' in any position j) Find the teacher name where _N' is in the second position k) Find the name of teachers whose name starts with _D' and ends with _A' l) Change the address of all teachers to _PUNE' m) Change the address of teacher _Arti' to _Bangalore' Apply arithmetic operators on salary column of teacher table for the teacher who has teacherid = 2001	
5.	Queries with Constraints a) Create the subject table with Primary Key Constraint b) Create teaches table with foreign key Constraint c) Create an supplier table with UNIQUE Constraint d) Create part Table with Check Constraints e) 5. Create project table with Default Constraint	CO3
6.	Aggregate Functions: a) Find the minimum, maximum, average and sum of salaries of teachers b) Count the total number of teachers present c) Retrieve the average salaries of all teachers who are in _BCA' department	CO3
7.	Queries on GROUP BY, HAVING AND ORDER BY Clauses a) Display total salaries of teachers by each department b) Find the address and the number of teachers staying at that address for addresses which have more than 1 teacher. c) Find all teachers sorted by address in ascending order and department in descending order d) Find the department and the number of teachers in that department	CO4
8.	Queries on Operators a) Find the name, department and salary of teachers which have salary equal to or greater than 20000 and less than or equal to 60000. b) Find the name, teacherid and departments of teachers who are in _CSE' department or _IT' department c) Find the name, department and salary of teachers for which salary is 20000 and department = _BCA' d) Find the subjectid and subname of subjects, which has the word _NET' anywhere in its subname. e) Find the subjectid and subname of subjects with subjectname either _OS' or _DBMS' f) List the subjects which have credits 2, 3, or 4. g) Find all the distinct subtype of subjects.	CO4
9.	Join Operators a) Perform Inner join on two tables b) Perform Natural Join on two tables c) Perform Left Outer Join on tables d) Perform Right Outer join on tables e) Perform Full Outer Join on tables	CO5
10.	Mongo DB Queries a) Create a collection. b) Insert documents into Created Collection c) Use insertMany() to insert more records	CO5



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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)



	d) View the inserted records, raw and formatted e) Select all documents in collection f) Find count of all customers g) Show the records which have age equal to 18 h) Find all records which have fees between 1500 and 2500 i) retrieve all documents from the cust collection where status equals either "D" or "E" j) Retrieve all documents where grade is equal to _B' AND (fees is less than 2000 OR name starts with letter _K')	
Total Hours: 15 hrs.		

Course Code: CBCA0455				Course Name: Web Technologies				L	T	P	C
Course Offered in: BCA								0	0	6	3
Pre-requisite: Student should have basic knowledge of HTML, CSS											
Course Objectives: After completion of the course, the student will be able to											
The objective of this course is to provide students with a comprehensive understanding of Web Technology, focusing on the development of dynamic, responsive, and interactive websites.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Taxonomy		
CO1	Describing the concepts of web technology, internet and Web Designing,								K2		
CO2	Design static and dynamic web pages using HTML and CSS,								K3		
CO3	Implementing client-side script programming using JavaScript								K3		
CO4	Discuss the basics of server-side scripting using PHP								K2		
CO5	Demonstrate an in-depth understanding of advanced PHP syntax and develop dynamic and efficient web applications.								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	2	1	1	1	2			
CO2	3	2	3	3	2	1	1	2			
CO3	3	2	3	3	1	1	1	2			
CO4	3	2	3	3	1	1	1	2			
CO5	3	3	3	3	2	2	1	3			
Course Contents / Syllabus											
Unit 1			Introduction to Web Technology & Basics of HTML							09 hours	
Introduction to Web Technology: Internet, Basic Internet Terminology, World Wide Web, Web page, home page, Web site Introduction to HTML: Essential Tags, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags (DIV, MARQUEE, NOBR, DFN, HR, List tag , Comment, IMG), Color and Background of Web Pages, Lists and their Types, Attributes of Image Tag, Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents, Different Section of a Page and Graphics, Footnote and E-Mailing, Creating Table											
Unit 2			HTML&CSS							09 hours	
HTML Frames: Frames and Framesets. HTML forms: 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							09 hours	
Basics of Javascript: Introduction to JavaScript: Advantages of Javascript, Difference between Javascript and Jscript; Basic Programming Techniques: Data Types and Literal, Creating Variables and Javascript Array; Operators and Expressions in javascript: Arithmetic Operators, Logical Operators, Comparison Operators, String Operators, Conditional Operators; Javascript Programming Constructs: Conditional checking, Loops Advance JavaScript: Functions in JavaScript: Built in Functions and User Defined Functions; Dialog Boxes: Alert Dialog Box, Confirm Dialog Box, Prompt Dialog Box; JavaScript Document Object Model (DOM): Object hierarchy in DOM, Event Handling; Form Object: Form Object's Methods and Properties, Text Element, Button Element, etc; Other Built in Objects in Javascript, String, Math and Date Object; Writing Client-Side Validations from HTML Form Elements.											
Unit 4			Basics of PHP							09 hours	
Basics of PHP; PHP: Downloading, installing, configuring PHP, basic syntax of PHP program, Variables and data types, operators, expressions and statements, decision and looping PHP Arrays & Functions: Arrays, Functions, Browser control and detection, string, Form processing											

Unit 5		Advance PHP	09 hours
Database Connectivity: Connecting to database (My SQL as reference), executing simple queries, handling results, Handling sessions and cookies. File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories			
			Total Lecture Hours
			45 hours
Textbook:			
1.HTML, DHTML. JavaScript, and PHP, BPB Publications, 5th Edition, 2005			Bayross Ivan
2—Web Technology and Design, New Age International, Second edition, 2022 Xavier, C			P.J.Deitel & H.M.Deitel
3Internet and World Wide Web How to program, Pearson, 5th edition (2012)			
Reference Books:			
1.HTML5 for Web Designers, 2nd Edition 2016			Jeremy Keith
2.Web Technologies Black Book, 2009			dreamTech
3.PHP and MySQL, Prentice Hall 1st Edition 2006			Ellie Quigley,
Self-Study Content Links:			Duration (in Hrs)
MOOCs	Coursera Web Design for Everybody – https://www.coursera.org/specializations/web-design		15 hrs
Video Lectures	CodeWithHarry Web Development Playlist – https://www.youtube.com/@CodeWithHarry		10 hrs
Web References	W3Schools Web Technology Tutorials – https://www.w3schools.com		

LAB Course Code: CBCA0455			LAB Course Name: : Web Technologies			L	T	P	C
Course Offered in: BCA						0	0	6	3
Pre-requisite: Student should have basic knowledge of HTML, CSS									
Course Objectives:									
The objective of this course is to provide students with a comprehensive understanding of Web Technology, focusing on the development of dynamic, responsive, and interactive websites.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Describing the concepts of web technology, internet and Web Designing,								K2
CO2	Design static and dynamic web pages using HTML and CSS,								K3
CO3	Implementing client side script programming using JavaScript								K3
CO4	Describe basics of server-side scripting using PHP								K2
CO5	Demonstrate an in-depth understanding of advanced PHP syntax and develop dynamic and efficient web applications.								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	2	1	1	1	2	
CO2	3	2	3	3	2	1	1	2	
CO3	3	2	3	3	1	1	1	2	
CO4	3	2	3	3	1	1	1	2	
CO5	3	3	3	3	2	2	1	3	
S.No.	List of Experiment/Program								CO
1.	Write a program for different formatting tags used in HTML.								CO1
2.	Write a program for different types of list.								CO1
3.	Write a program to show implementation of nested list.								CO1
4.	Write a program for printing class time table showing use of rowspan and colspan.								CO1
5.	Program to show the use of target attribute with different values								CO1
6.	Write a program to create a web page using img tag with all its attributes.								CO1
7.	Write a program to create a web page using image as hyperlink.								CO1
8.	Create a small website of four pages showing use of external link								CO1
9.	Write a program to set a background image for both the page and single elements on the page and control the repetition of the image with the background-repeat property								CO1
10.	Write a program to create a web page showing the use of font and text attribute of CSS.								CO2
11	Write a program to create a web page showing the use of color and background attribute of CSS.								CO2
12	Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.								CO2
13	Write a program to create a web page showing the use of inline, internal and External CSS.								CO2
14	Write a program to create a web page showing the use of implementation of BOX model in CSS.								CO2
15	Write a program to create a web page showing the use of CSS positioning.								CO2

16	Write a program to design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.	CO2
17	Create your resume using HTML tags also experiment with colors, text, link, size and also other tags you studied.	CO2
18	Design the static web pages required for an online book store web site - Design The login page contains the user's name and the password of the user to authenticate. - Design The catalogue page should contain the details of all the books available in the web site in a table.	CO2
19	Design of the cart page and the registration page required for online book store.	CO2
20	Write a program to create a —registration form —with the following fields - Name (Textfield) - Password (password field) - E-mail id (text field) - Phone number (text field) - Sex (radio button) - Date of birth (3 select boxes) - Languages known (check boxes – English, Telugu, Hindi, Tamil) - Address (text area)	CO2
21	Design a web page using CSS (Cascading Style Sheets) which includes the following: - Use different font, styles: In the style definition you define how each selector should work. - Then, in the body of your pages, you refer to these selectors to activate the styles.	CO3
22	Write a JavaScript Program to Print Hello World.	CO3
23	Write a JavaScript Program to Add Two Numbers	CO3
24	Write a JavaScript Program to Find the Square Root	CO3
25	Write a JavaScript Program to Calculate the Area of a Triangle	CO3
26	Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript	CO3
27	Write a JavaScript Program to Swap Two Variables	CO3
28	Write a JavaScript Program to Convert Celsius to Fahrenheit	CO3
29	Write a JavaScript Program to Convert Decimal to Binary	CO3
30	Write a JavaScript Program to Check if a number is Positive, Negative.	CO3
31	JavaScript Program to Find the Factorial of a Number	CO3
32	JavaScript Program to Check Prime Number	CO3
33	JavaScript Program to Display the Multiplication Table	CO3
34	JavaScript Program to Print the Fibonacci Sequence	CO3
35	JavaScript Program to Check Armstrong Number	CO3
36	JavaScript Program to Find the Sum of Natural Numbers	CO3
37	Write a JavaScript code to enter week day number and print day name.	CO3
38	JavaScript Program to Set a Default Parameter Value For a Function	CO3
39	JavaScript Program to Illustrate Different Set Operations	CO3
40	JavaScript Program to Check If a Variable is of Function Type	CO3
41	JavaScript Program to Pass Parameter to a setTimeout() Function	CO3
42	JavaScript Program to Pass a Function as Parameter	CO3
43	Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.	CO3
44	Write a program to create dialogue boxes using JavaScript.	CO3
45	JavaScript Program to Create Objects in Different Ways	CO3

46	JavaScript Program to Loop Through an Object	CO4
47	JavaScript Program to Merge Property of Two Objects	CO4
48	JavaScript Program to Remove a Property from an Object	CO4
49	JavaScript Program to Display Date and Time	CO4
50	JavaScript Program to Check Leap Year	CO4
51	JavaScript Program to Format the Date	CO4
52	JavaScript Program to Display Current Date	CO4
53	Write a program to create an Array in JavaScript	CO4
54	JavaScript Program to Convert Objects to Strings	CO4
55	JavaScript Program to Include a JS file in Another JS file	CO4
56	JavaScript Program to Get File Extension	CO4
57	Create a small website for 4 web pages and connect them using external linking.	CO4
58	JavaScript Program to Validate An Email Address	CO4
59	Write a Java Script program for login form validation.	CO4
60	Write JavaScript to validate the following fields of the above registration page. 1. Name (Name should contains alphabets and the length should not be less than 6 characters). 2. Password (Password should not be less than 6 characters length). 3. E-mail id (should not contain any invalid and must follow the standard pattern nam@domain.com 4. Phone number (Phone number should contain 10 digits only).	CO4
61	Install and configure PHP, web server, MYSQL	CO4
62	Write a program to print —Welcome to PHP!	CO4
63	JavaScript Program to Validate An Email Address	CO4
64	Write a Java Script program for login form validation.	CO4
65	. Write JavaScript to validate the following fields of the above registration page. 1. Name (Name should contains alphabets and the length should not be less than 6 characters). 2. Password (Password should not be less than 6 characters length). 3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com) 4. Phone number (Phone number should contain 10 digits only).	CO4
66	Install and configure PHP, web server, MYSQL	CO4
67	Write a program to print —Welcome to PHP!	CO4
68	. Write a simple PHP program using expressions and operators	CO4
69	Write a PHP program to demonstrate the use of Decision making control structures using a. If statement b. If-else statement c. Switch statement	CO4
70	Write a php program to check whether given number is palindrome or not.	CO4
71	Write a php program to check whether given number is Armstrong or not.	CO4
72	Write a Mathematical calculator program.	CO4
73	Write a PHP program to demonstrate the use of Looping structures using a) While statement b) Do-while statement c) For statement d) Foreach statement	CO4
74	Write a PHP program for creating and manipulating a) Indexed array b) Associative array c) Multidimensional array	CO4
75	A. Write a PHP program to- • Calculate length of string. • Count the number of words in string without using string functions	CO4
76	Write a simple PHP program to demonstrate use of various built-in string functions.	CO5
77	Write a simple PHP program to demonstrate use of simple function and parameterized function.	CO5

78	Design a web page using following form controls: a. Text box, b. Radio button, c. Check box, d. Buttons	CO5
79	Create a PHP page for login page without sql connection.	CO5
80	Create a PHP page for login page with sql connection.	CO5
81	Write a PHP program for sending and receiving plain text message (email).	CO5
82	Develop web page with data validation.	CO5
83	Write simple PHP program to - a. Set cookies and read it. b. Demonstrate session management	CO5
84	Write a PHP program for sending and receiving plain text message (email).	CO5
85	Develop a simple application to - a) Enter data into database b) Retrieve and present data from database	CO5
86	Develop a simple application to Update, Delete table data from database	CO5
87	Write a php program to Read from existing file.	CO5
88	Write a php program to Write a file	CO5
89	. Write a php program to design Curriculum Vitae.	CO5
90	Write a php program to calculate Date and Time function .	CO5
91	Create a PHP page for login system using session.	CO5
		Total Hours: 30 hrs.

LAB Course Code: CBCA0456			LAB Course Name: Workplace Communication Lab IV			L	T	P	C
Course Offered in: BCA						0	0	2	1
Pre-requisite:: The students should have completed workplace communication course in semester III									
Course Objectives:									
• Attain a high level of fluency and accuracy in professional communication. • Develop the ability to communicate effectively and persuasively in real-world business scenarios. • Acquire the skills and competencies necessary to excel in the workplace and drive career growth.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy	
CO1	Recall the key elements of maxing the placement process and functioning as a professional.								K1
CO2	Comprehend complex conversations and formal texts to grasp tone and intent.								K4
CO3	Demonstrate appropriate verbal and non-verbal communication for the workplace.								K3
CO4	Analyse workplace communication practices to identify strengths and weaknesses.								K4
CO5	Compose audience-centric, Industry-relevant, business documents that drive results								K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	1	1	1	1	3	1	1	2	
CO2	1	1	1	1	3	1	1	2	
CO3	1	1	1	1	3	1	1	2	
CO4	1	1	1	1	3	1	1	1	
CO5	1	1	1	1	3	1	1	2	
S.No.	List of Experiment/Program								CO
1.	Introduction To the course • Exam Pattern · Anubhav Activity On score improvement								CO1
2.	Advanced Vocabulary • The students will enhance their vocabulary through various exercises.								CO2
3.	Writing Short Essays • The students will learn to logically arrange and develop ideas.								CO2
4.	Presentation Skills • The students will learn to design and deliver effective presentations.								CO5
5.	Group Discussions • Domain specific topics and on current affairs to improve the grasp of students								CO5
6.	Debate • The students will learn persuasive speech and to differentiate between assertive and aggressive language.								CO2
7.	Verbal Ability • Analogies · The students will practice solving simple analogies. • Sentence Correction · The students will learn to spot grammatical errors and correct them.								CO2

	Sentence Correction · The students will learn to spot grammatical errors and correct them.	
8.	Verbal Ability - Analogies · The students will practice solving simple analogies. - Sentence Correction · The students will learn to spot grammatical errors and correct them.	CO5
9.	Video Conferencing The students will develop the skills to engage confidently in online communication, such as video conferencing.	CO4
10.	Describing real -life events The students will learn to narrate in front of an audience.	CO2
11	Story Reading The students will learn correct pronunciation and voice modulation.	CO5
12	Impromptu Speaking Preparing and speaking on random topics	CO2
13	Role Play The students learn to carry out conversations in various professional settings.	CO5
14	Online Presence; Writing Blogs & Creating Vlogs - The students learn the nuances of what to write and what not to write on social media. - The students will learn to write effective blogs for outreach and create engaging vlogs to communicate their ideas.	CO5
15	Elevator Pitch Crafting a winning elevator pitch for showcasing innovative ideas, products, and services.	CO3
16	Interview Skills - Analyzing interview clips and techniques - Mock interviews and feedback	CO4
17	Describing real -life events The students will learn to narrate in front of an audience.	CO3
18	Podcast Listening and Summarization Listening to understand the key points.	CO3
19	Virtual etiquette - Online and Mobile Etiquette in virtual workplace meetings - Camera and Microphone Etiquette/ Chat Box Communication - Dress Code for Virtual Meetings/ Background and Environment Setup	CO2
20	Professional Email Skills: Responding to emails with clarity, tact, and professionalism	CO3
21	Visual Communication Interpreting infographics and data visualizations	CO3
22	Time Management for Effective Communication	CO4

	Prioritizing tasks and managing time for efficient communication.	
23	Peer Evaluation The students will learn to evaluate and provide feedback.	CO5
24	Personal Communication Audit Reflecting on communication development and progress	CO4
Total Hours: 15 hrs.		

LAB Course Code: CBCA0411P		LAB Course Name: : Image Editing with Photoshop Lab			L	T	P	C
Course Offered in: BCA					0	0	4	2
Pre-requisite: Basic Knowledge of computer								
Course Objectives:								
To familiarize students with the Adobe Photoshop interface and workspace.To enable students to perform image editing using selection, correction, and retouching tools.To build skills in layer management, typography, digital painting, and web design.To encourage creativity through compositing, special effects, and final project creation.To introduce automation tools and integration with Adobe Creative Cloud apps.								
Course Outcome: After completion of the course, the student will be able to								Bloom's Taxonomy
CO1	Navigate and customize the Photoshop interface and use selection tools effectively.							K2
CO2	Perform basic and advanced image corrections, masking, and retouching.							K3
CO3	Work with layers, blending modes, smart objects, and apply filters non-destructively.							K4
CO4	Design web graphics and digital artworks using painting and special effects.							K5
CO5	Automate repetitive tasks and compile a professional digital portfolio.							K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)								
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	2	1	1	-	1
CO2	3	3	2	2	1	1	-	1
CO3	3	3	3	3	2	2	1	2
CO4	3	3	3	3	3	2	-	2
CO5	3	3	3	3	3	3	-	3
S.No.	List of Experiments/Program							CO
1	Navigating Photoshop: Interface, tools, and workspace customization							CO1
2	Creating and Managing Layers: Layer properties, blending modes, grouping							CO1
3	Making Selections: Marquee, Lasso, Quick Selection, Magic Wand							CO1
4	Refining Selections & Masking: Layer masks, Select and Mask, feathering							CO2
5	Image Corrections: Adjusting brightness/contrast, levels, curves							CO2
6	Retouching Tools: Clone Stamp, Healing Brush, Patch Tool, Content-Aware Fill							CO2
7	Typography: Text layers, formatting, layer styles (shadow, glow)							CO3
8	Composite Images: Merging multiple images with masks and blend modes							CO3
9	Smart Objects & Filters: Use of Smart Objects and Smart Filters							CO3
10	Web Graphics: Designing banners, icons, and UI components							CO4
11	Special Effects: Artistic filters, lighting effects, layer effects							CO4
12	Digital Painting: Custom brushes, smudging, blending							CO4
13	Automation: Recording Actions, batch processing							CO5
14	Integration: Import/export with Illustrator and InDesign							CO5
15	Final Project: Create a comprehensive portfolio with selected works							CO5
Total Hours: 30 hrs.								

LAB Course Code: CBCA0412P				LAB Course Name: : CRM Administration Lab				L	T	P	C
Course Offered in: BCA								0	0	4	2
Pre-requisite: Creative thinking and which is being used by the creative talent in your business areas.											
Course Objectives:											
To make the students understand the organizational need, benefits and process of creating long-term value for individual customers. To disseminate knowledge regarding the concept of e-CRM and e- CRM technologies. To enable the students, understand the technological and human issues relating to implementation of Customer Relationship Management in the organizations											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Describe the fundamental concepts of Customer Relationship Management.										K2
CO2	Configure and customize Salesforce CRM to support various business needs.										K3
CO3	Implement security and data protection measures in CRM systems.										K4
CO4	Develop automation processes using Salesforce tools like Flow and Process Builder.										K5
CO5	Generate reports and dashboards to support business decision-making.										K6
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	2	2	1	1	1	2			
CO2	3	3	3	3	2	2	1	2			
CO3	3	3	2	3	2	2	3	2			
CO4	3	3	3	3	2	2	1	3			
CO5	3	3	3	3	2	2	1	3			
List Of Practical's (Indicative & Not Limited To)									CO		
S.No.	List of Experiments/Program								CO		
1.	Quick Start: Lightning App Builder								CO1		
2.	Prepare Your Salesforce Org for Users								CO1		
3.	Customize an Org to Support a New Business Unit								CO1		
4.	Protect Your Data in Salesforce								CO2		
5.	Customize a Sales Path for Your Team								CO2		
6.	Setup the Service Console								CO2		
7.	Build a Discount Approval Process								CO3		
8.	Quick Start Process Builder								CO3		
9.	Build a Simple Flow								CO3		
10.	Build a Battle Station App								CO4		
11.	Customize a Salesforce Object								CO4		
12.	Create Reports and Dashboards for Sales and Marketing Managers								CO5		
13.	Improve Data Quality for Your Sales and Support Teams								CO5		
14.	Create a Process for Managing Support Cases								CO5		
Total Hours: 30 hrs.											

LAB Course Code: CBCA0413P				LAB Course Name: Machine Learning Lab				L	T	P	C
Course Offered in: BCA								0	0	4	2
Pre-requisite:Basic knowledge of Python and AI											
Course Objectives:											
The objective of the Machine Learning Lab is to provide hands-on experience with implementing and experimenting with key machine learning algorithms. It aims to enhance students' understanding of model training, evaluation, and real-world application using programming tools and datasets.											
Course Outcome: After completion of the course, the student will be able to										Bloom's Taxonomy	
CO1	Apply fundamental regression techniques (Linear and Logistic) to model relationships within data.								K3		
CO2	Implement and analyze classic machine learning algorithms such as k-NN, Decision Trees (ID3), SVM, Naïve Bayes, and ANN using real-world datasets.								K4		
CO3	Compare and evaluate clustering techniques such as K-Means and Expectation-Maximization (EM) to assess the quality of results.								K5		
CO4	Demonstrate the use of ensemble learning and advanced regression methods like Gradient Boosting and Locally Weighted Regression for performance optimization.								K3		
CO5	Design and conduct machine learning experiments, and compute key performance metrics including accuracy, precision, and recall for model evaluation.								K6		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	-	-	-	2			
CO2	3	2	3	3	1	-	1	2			
CO3	3	3	2	3	-	-	1	2			
CO4	3	3	3	3	1	-	1	3			
CO5	3	3	3	3	1	1	1	3			
List Of Practical's (Indicative & Not Limited To)										CO	
S.No.	List of Experiment/Program								CO		
1.	Write a program to perform various types of regression (Linear & Logistic).								CO1		
2.	Implement Apriori algorithm using sample data in Python.								CO1		
3.	Write a program to demonstrate the working of the decision tree based ID3algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.								CO2		
4.	Write a program to implement k-Nearest Neighbour algorithm to classify the iris dataset. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.								CO2		
5.	Apply EM algorithm to cluster a set of data. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.								CO3		
6.	Implement Support Vector Machine using Scikit-learn.								CO3		
7.	Implement the non-parametric Locally Weighted Regression algorithm to fit data points. Select appropriate data set for your experiment and draw graphs.								CO4		
8.	Implement Gradient Boosting Machine Ensemble in Python.								CO4		
9.	Implement of ANN algorithm using a sample dataset.								CO5		

10.	Implement naïve Bayesian Classifier model. Write the program to calculate the accuracy, precision, and recall for your data set.	CO5
Total Hours: 30 hrs.		