

PROGRAMME COURSE STRUCTURE (ALL SEMESTERS)

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI, JHARKHAND COURSE STRUCTURE – *Proposed from Monsoon 2026* Based on New Education Policy (NEP 2020) Model Recommended scheme of study for MCA Programme

Sl. No.	Semester of Study (Recommended)	Category of Course	Course Code	Course Name	Mode of Delivery and Credits L-Lecture, T-Tutorial, P-Practical, SL-Self-Learning				Total Credits
					L (Periods /Week)	T (Periods /Week)	P (Periods /Week)	SL (Periods /Week)	
					THEORY				
1.1	Semester I	Core1 (Th)	CA265 01	Understanding OOP using Java	3	0	0	0	3
1.2		Core2 (Th)	CA265 03	Data Structures	3	0	0	0	3
1.3		Core3 (Th)	CA265 05	Concepts of Database Management System	3	0	0	0	3
1.4		Core4 (Th)	CA265 07	Formal Language and Automata Theory	3	0	0	0	3
1.5		Core5 (Th)	CA265 09	Mathematics for Computing	3	0	0	0	3
					LABORATORY				
1.6		Core1 (P)	CA265 04	Data Structures using Java Lab	0	0	3	0	1.5
1.7		Core2 (P)	CA265 06	Database Management System Lab	0	0	3	0	1.5
1.8		Skill1	CA265 10	Web Application Development Skills using HTML and CSS	0	0	2	2	2
TOTAL (THEORY + LAB + SKILL)									20

		THEORY							
2.1	Seme ster II	Core1 (Th)	CA265 11	Operating Systems	3	0	0	0	3
2.2		Core2 (Th)	CA265 13	Analysis of Algorithms	3	0	0	0	3
2.3		Core3 (Th)	CA265 15	Python Programming	2	0	0	0	2
2.4		Core4 (Th)	CA265 17	Software Design Patterns	3	0	0	0	3
2.5		Core5 (Th)	CA265 19	Data Communication and Computer Networks	3	0	0	0	3
2.6		Elec1 (Th)	CA265 XX	PE 1	3	0	0	0	3
		LABORATORY							
2.7		Core1 (P)	CA265 16	Python in Linux	0	0	3	0	1.5
2.8		Core2 (P)	CA265 20	Data Communication and Computer Networks Lab	0	0	3	0	1.5
2.9		Skill1	CA265 22	Learning Power BI Applications	0	0	2	2	2
TOTAL (THEORY + LAB + SKILL)									22
GRAND TOTAL FOR FIRST YEAR									42
Exit After 1st Year with Post Graduate Diploma in Computer Applications									
2.1 0	PG Diploma in Computer Applications		Research/ Application Project				4	Total Credit 46	
3.1	Seme ster III	Core1 (Th)	CA266 01	Machine Learning	3	0	0	0	3
3.2		Core2 (Th)	CA266 03	Cryptography	3	0	0	0	3
3.3		Elec2 (Th)	CA266 XX	PE 2	3	0	0	0	3
3.4		Elec3 (Th)	CA266 XX	PE 3	3	0	0	0	3
3.5		OE	XX26X XX	Open Elective/ MOOC (Technology Entrepreneurship or relevant courses)	3	0	0	0	3
3.6		LABORATORY							
3.7		Core1 (P)	CA266 02	Machine Learning Lab	0	0	3	0	1.5
3.8		Elec1 (P)	CA266 XX	PE 3 Lab	0	0	3	0	1.5

3.9		Project	CA26600	Research/ Application Project					6
TOTAL (THEORY + LAB + PROJECT)									24
4.1	Semester IV	Core1	CA26660	Research Project/ Industry Internship					20
TOTAL (PROJECT + VIVA)									20
GRAND TOTAL FOR SECOND YEAR									44
GRAND TOTAL FOR MCA									86
Lateral Entry After First Year (Students must cover at least 70% of the Syllabus of regular First year courses) (Academic Eligibility criteria for lateral entry are BCA 4 years, B.Sc. Honours in CS or IT (4 Years) and PGDCA)									

List of Program Electives

PE	Track	Course Code	Course Name
1	Track: Core Courses	CA26521	Computer Organization & Architecture
		CA26523	Multimedia Technologies
		CA26525	Data Compression
		CA26527	Digital Signal Processing
		CA26529	Graph Theory
		CA26531	Modelling and Solving Optimization Problems
		CA26533	Fuzzy Computing
	Track: Modern Computing Paradigm	CA26535	Data Warehouse and Data Mining
		CA26537	Information Retrieval
		CA26539	Data Visualization using Python
2	Track: Web Application	CA26541	Introduction to NoSQL Backends
		CA26543	Frontend Design 1
		CA26545	Introduction to Web Scraping
	Track: Core Courses	CA26605	Image Processing
		CA26607	Cloud Computing
		CA26609	Network Analysis
		CA26611	Evolutionary Computing
		CA26613	Reinforcement Learning
		CA26615	Natural Language Processing
	Track: Web Application	CA26617	Modern Web Architecture
		CA26619	Web Security
		CA26621	Frontend Design 2
	Track: Advance	CA26623	Advanced Database Systems
		CA26625	Bioinformatics

	d Modern Computing	CA26627	Retrieval Augmented Generation
3	Track: Core Courses	CA26629	Internet of Things
		CA26630	Embedded System Lab
		CA26631	Shell Scripting
		CA26632	Shell Scripting Lab
		CA26633	Mobile Application Development using Flutter
		CA26634	Mobile Application Development using Flutter Lab
		CA26635	Software Testing and Version Control
		CA26636	Software Testing and Version Control Lab
		CA26637	Advanced Programming in Java
		CA26638	Advanced Programming in Java Lab
	Track: Modern Computing Paradigm	CA26639	Deep Learning
		CA26640	Deep Learning Lab
		CA26641	Large Language Models
		CA26642	Large Language Models Lab
		CA26643	Generative AI
		CA26644	Generative AI Lab
		CA26645	Computer Vision
		CA26646	Computer Vision Lab
	Track: Web Application	CA26647	Introduction to Django
		CA26648	Full Stack using Django Lab
		CA26649	Introduction to Laravel
		CA26650	Full Stack using Laravel lab
		CA26651	Frontend Engineering using React JS
		CA26652	Full Stack using React JS Lab
	Track: Advanced Modern Computing	CA26653	Agentic AI Systems
		CA26654	Agentic AI Systems Lab
		CA26655	Prompt Engineering
		CA26656	Prompt Engineering Lab
		CA26657	Quantum Computing
		CA26658	Quantum Computing Lab

MCA COURSE STRUCTURE ALIGNING WITH BLOOM'S TAXONOMY

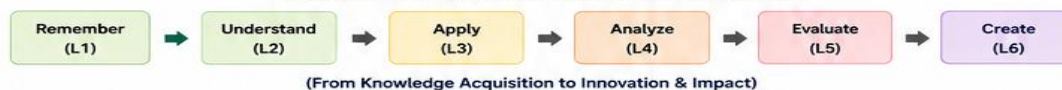
Progression of Cognitive Skills from Knowledge Acquisition to Innovation & Impact

BLOOM'S TAXONOMY (COGNITIVE DOMAIN)

L1 Remember	L2 Understand	L3 Apply	L4 Analyze	L5 Evaluate	L6 Create
Recall facts and basic concepts	Explain ideas and concepts	Use knowledge in new situations	Examine and break information	Make judgments based on criteria	Produce new ideas or solutions

SEMESTER (LEVEL FOCUS)	COURSES (Theory / Practical / Skills / Project)				ASSESSMENT ALIGNMENT (Examples)
SEMESTER I (L1–L3 Focus) Foundation Building 	- Understanding OOP using Java - Data Structures - DBMS Concepts - Formal Language & Automata Theory - Mathematics for Computing	- Concepts of DBMS - Mathematics for Computing - Web Application Development Skills (HTML & CSS)	- Data Structures using Java Lab - DBMS Lab - Web Development (HTML & CSS)		- Quizzes (L1–L2) - Assignments (L2–L3) - Mid Sem Exam (L2–L3) - Lab Performance (L3) - End Sem Exam (L2–L3)
SEMESTER II (L2–L4 Focus) Application & Analysis 	- Operating Systems - Analysis of Algorithms - Python Programming - Software Design Patterns - Data Communication & Networks	- Python in Linux Lab - DCN Lab - Power BI Applications (Skill Course)	- Analysis of Algorithms - Design Patterns – Case Analysis - Mini Projects - Elective 1		- Quizzes (L2) - Assignments (L3) - Mid Sem Exam (L3–L4) - Case Study / Tutorial (L4) - Lab & Skill Evaluation (L3–L4) - End Sem Exam (L3–L4)
SEMESTER III (L3–L6 Focus) Advanced Learning & Problem Solving 	- Machine Learning - Cryptography - Elective 2 - Elective 3 - Open Elective / MOOC	- ML Lab - Elective Lab - Research/Application Project (Part I) - Case Studies & Paper Analysis	- Project Evaluation - Technical Seminar - Model Performance Evaluation - Research Report	- Research/Application Project – Innovation - Prototype Development - Solution Design - Project Presentation	- Assignments (L3–L4) - Case Study / Paper Review (L4) - Mid Sem Exam (L3–L4) - Project Work (L4–L6) - Seminar (L5) - End Sem Exam (L4–L5)
SEMESTER IV (L5–L6 Focus) Research, Innovation & Professional Excellence 			- Industry Internship / Research Project Evaluation - Progress Presentation	- Dissertation / Thesis - Final Project Development - Viva Voce - Industrial Evaluation - Innovation & Deployment	- Project Report (L5–L6) - Viva Voce (L6) - Industrial Evaluation (L5–L6) - Innovation & Impact (L6)

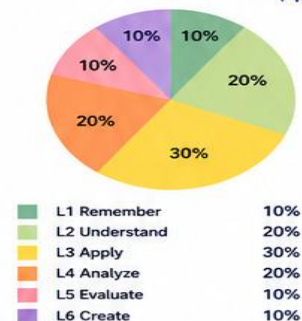
PROGRESSION OF LEARNING ACROSS THE MCA PROGRAM



COURSE CATEGORIES AND BLOOM LEVEL EMPHASIS

	Core Theory Courses	L1 – L4
	Laboratory Courses	L3 – L6
	Skill Courses	L3 – L5
	Elective Courses	L3 – L6
	Research Project	L4 – L6
	Internship / Industry Project	L5 – L6

OVERALL PROGRAM BLOOM DISTRIBUTION (Approx.)



DELIVERY METHODS (Aligned to Bloom Levels)

	L1 – Lectures, Reading Materials
	L2 – Interactive Lectures, Discussions
	L3 – Tutorials, Labs, Assignments
	L4 – Case Studies, Problem Solving, Code Analysis
	L5 – Seminars, Paper Reviews, Project Evaluation
	L6 – Projects, Hackathons, Research, Innovation Labs

This framework ensures a systematic progression of cognitive skills across the MCA program in alignment with NEP 2020, Outcome Based Education (OBE) and industry expectations.