PROGRAMME COURSE STRUCTURE

BIRLA INSTUTURE OF TECHNOLOGY-MESRA, RANCHI
COURSE STRUCTURE FOR BACHELOR OF COMPUTER APPLICATION(BCA)
as per NEP-2020
(w.e.f. Academic Session2025-26)

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L-Lecture; T-Tutorial; P-Practical			Total Credits C
			THEORY		L	T	P	C
First Monsoon	First	Pre-requisite course *	PR25001	Elementary Mathematics	3	0	0	0
		DSC-Elective		DSC-Elective I	3	0	0	3
		DSC-Course	CA25105	Basics of Operating Systems	3	0	0	3
		DSC-Course	CA25107	Fundamentals of Computer Science	2	0	0	2
		MDC	MN25106	Principles of Management	3	0	0	3
		VAC–Elective		VAC Elective		-	-	2
		VAC–Elective		VAC Elective	-	-	-	2
		LABORATORIES						
		AECC	HS24131	Communication Skills-I	0	0	3	1.5
		DSC Lab		DSC Lab –Elective I	0	0	3	1.5
		SEC-SB Elective		SEC-SB Elective I	-	-	-	3
		TOTAL						21

*[will be pass course with no credits]

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery & credits L-Lecture; T-Tutorial; P-Practical			Total Credits C
					L (Periods/ week)	T (Periods /week)	P (Periods /week)	C
Second Spring	First	**THEORY**						
		DSC-Course	CA25121	Introduction to Data Structures	3	1	0	4
		DSC-Course	CA25123	Basics of Digital Computer and Logic Design	3	1	0	4
		MDC	CA25131	Mathematics for Computing I	3	1	0	4
		VAC–Elective		VAC Elective	2	0	0	2
		LABORATORIES						
		AECC	HS24133	Communication Skills-II	0	0	3	1.5
			CA25122	Data Structure Lab	0	0	3	1.5

EXIT OPTION WITH CERTIFICATION IN COMPUTER APPLICATIONS

		SEC-SB Elective		SEC-SB Elective II	-	-	-	3
		Total						**20**
		GRAND TOTAL FOR FIRST YEAR						**41**
VOCATIONAL COURSES FOR EXIT AFTER 1st Year								
Vocational Course I		MN25120	Event Management		3	0	0	3
Vocational Course II		CA25133	Fundamentals of Multimedia		3	0	0	3

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L- Lecture; T-Tutorial; P-Practical			Total Credits C
					L (Periods/ week)	T (Periods/ week)	P (Periods /week)	C
Third Monsoon	Second	**THEORY**						
		DSC-Course	CA25201	Java Programming	3	0	0	3
			CA25203	Database Management System	3	0	0	3
			CA25205	Computer Organization &Architecture	3	0	0	3
		MDC	CA25207	Mathematics for Computing II	3	0	0	3
		AECC	MN25109	Public speaking and creative writing	1	0	2	2
		SEC-SB		SEC-SB Elective III	2	0	2	3
		LABORATORIES						
		DSC Lab	CA25202	Java Lab	0	0	3	1.5
		DSC Lab	CA25204	DBMS Lab	0	0	3	1.5
		TOTAL						**20**

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L-Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods /week)	T (Periods /week)	P (Periods /week)	C
Fourth Spring	Second	**THEORY**						
		DSC-Course	CA25221	Software Engineering	3	1	0	4
		DSC-Course	CA25223	Python Programming	3	1	0	4
		DSC-Course	CA25225	Computer Networks	3	0	0	3
		DSE-Elective		DSE Elective I	3	0	0	3
		AECC	MN25201	Personality Development	2	0	2	3
		MC	HU24211	Indian Knowledge System				0
		LABORATORIES						
		DSC Lab	CA25222	Software Engineering Lab	0	0	3	1.5
		DSC Lab	CA25224	Python Programming Lab	0	0	3	1.5
			Total					20
				GRAND TOTAL FOR SECOND YEAR				40

VOCATIONAL COURSES FOR EXIT AFTER 2nd Year						
Vocational Course III	MN25214	Basic of Financial Markets and Equity Research	3	0	0	3
Vocational Course IV	CA25225	Business Intelligence	3	0	0	3

EXIT OPTION WITH DIPLOMA IN COMPUTER APPLICATIONS

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L-Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods /week)	T (Periods /week)	P (Periods /week)	C
Fifth Monsoon	Third	**THEORY**						
		DSC-Course	CA25301	Fundamentals of Computer Algorithm	3	1	0	4
		DSE-Elective		DSE-Elective II	3	0	0	3
		DSC-Course	CA25307	Web Programming	3	1	0	4
		DSC-Course	CA25309	Software Testing	3	1	0	4
		LABORATORIES						
		DSE Lab		DSE Lab-Elective II	0	0	3	1.5
		DSC-Course	CA25308	Web Programming Lab	0	0	3	1.5
		Minor Internship/ Project	CA25312	Internship/Project	0	0	0	2
		TOTAL						**20**

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L- Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
Sixth Spring	Third	**THEORY**						
		DSE Elective		DSE-Elective III	3	1	0	4
		DSC-Course	CA25335	Distributed Computing	3	0	0	3
		DSE-Elective		DSE-Elective IV	3	0	0	3
			CA25341	Optimization Techniques	3	1	0	4
		LABORATORIES						
		DSE Lab-Elective		DSE Lab-Elective III	0	0	3	1.5
		DSE Lab-Elective		DSE Lab-Elective IV	0	0	3	1.5
			CA25344	Minor Project	0	0	0	3
		TOTAL						**20**
GRAND TOTAL FOR THIRD YEAR								**40**

EXIT OPTION WITH DEGREE (BCA)
Total Credits [IYear+IIyear+IIIYear=41+40+40= 121

SPECIALIZATION:
Artificial Intelligence and Machine Learning/Data Science/High Performance Computing

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L- Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods/ week)	T (Periods/week)	P (Periods/ week)	C
		THEORY						
Seventh Monsoon	Fourth	DSE-Elective		DSE-Elective V Annexure A/Annexure B/Annexure C	3	1	0	4
		DSE-Elective		DSE-Elective VI Annexure A/Annexure B/ Annexure C	3	1	0	4
		DSE-Course	CA25407	Research Methodology	3	1	0	4
		DSE-Elective		DSE-Elective VII Annexure A/Annexure B/Annexure C	3	1	0	4
		LABORATORIES						
		DSE Lab-Elective		DSE Lab- Elective V Annexure A/Annexure B/Annexure C	0	0	4	2
		DSE Lab-Elective		DSE Lab-Elective VI Annexure A/Annexure B/ Annexure C	0	0	4	2
		TOTAL						**20**

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Mode of delivery and credits L- Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods/ week)	T (Periods/week)	P (Periods/ week)	C
		THEORY						
Eighth Spring	**Fourth**	DSE-Elective		DSE-Elective VIII Annexure A/Annexure B/ Annexure C	3	0	0	3
		DSE-Elective		DSE-Elective IX Annexure A/Annexure B/ Annexure C	3	0	0	3
		LABORATORIES						
		DSE Lab-Elective		DSE Lab-Elective VIII Annexure A/Annexure B/ Annexure C	0	0	4	2
		Research Project/ Dissertation	CA25470	Research project/Internship with Viva-voce and seminar presentation.	0	0	0	12
	TOTAL							**20**

AFTER FOURTH YEAR BACHELOR'S DEGREE: BCA HONOURS

Total Credits 161 for 4 years course
Student will select the specialization in one of the followings:

- **Annexure A-Artificial Intelligence and Machine Learning**
- **Annexure B-Data Science**
- **Annexure C-High Performance Computing**

Acronyms Expanded

- AECC : Ability Enhancement Compulsory Course
- DSC : Discipline-Specific Core (Course)
- DSE : Discipline-Specific Elective (Course)
- VAC :Value Added Course
- SEC-SB :Skill Enhancement Course-Skill Based
- MDC : Multidisciplinary Course

ELECTIVES

DSC Electives

	Course Code	Course	L	T	P	C
DSC-Elective I	CA25101	Programming and Problem-Solving using C	3	0	0	3
	CA25103	Programming and Problem-Solving using C++	3	0	0	3
DSC Lab–Elective I						
	CA25102	C Lab	0	0	3	1.5
	CA25104	C++ Lab	0	0	3	1.5

VAC Electives

	Course Code	Course	L	T	P	C
VAC Elective	MN25102	Human Values and Professional Ethics	2	0	0	2
	CA25109	Environmental Science	2	0	0	2
	MN25103	Yoga	1	0	2	2
	MN25104	Physical Education	1	0	2	2
	MN25111	Digital Empowerment	2	0	0	2
	MN25112	Emotional Intelligence	2	0	0	2

SEC-SB Electives

	Course Code	Course	L	T	P	C
SEC I	CA25110	Office Automation Tools	0	1	4	3
	CA25112	Linux administration	0	1	4	3
SEC II	CA25130	Programming with MATLAB	0	1	4	3
	CA25132	Introduction to Latex	0	1	4	3
SEC III	CA25209	Statistics with R	2	0	2	3
	CA25215	Computer Oriented Numerical Methods	2	0	2	3

DSE Electives

	Course Code	Course	L	T	P	C
DSE-Elective I	CA25227	Introduction to Data Science	3	0	0	3
	CA25229	Introduction to Artificial Intelligence	3	0	0	3
	CA25231	Enterprise Resource Planning	3	0	0	3
DSE-Elective II	CA25303	Introduction to Machine Learning	3	0	0	3
	CA25305	Computer Graphics	3	0	0	3
DSE Lab-Elective II	CA25304	Machine Learning Lab	0	0	3	1.5

	CA25306	Computer Graphics Lab	0	0	3	1.5
DSE-Elective III	CA25331	Advanced Java Programming	3	1	0	4
	CA25333	Data Analytics	3	1	0	4
DSE Lab-Elective III	CA25332	Advanced Java Programming Lab	0	0	3	1.5
	CA25334	Data Analytics Lab	0	0	3	1.5
DSE-Elective IV	CA25337	Introduction to Data Mining	3	0	0	3
	CA25339	Introduction to IOT	3	0	0	3
DSE Lab-Elective IV	CA25338	Data Mining Lab	0	0	3	1.5
	CA25340	IOT Lab	0	0	3	1.5

ANNEXURE A: Artificial Intelligence and Machine Learning

Courses and Labs to be taken from the following table in 7th and 8th semesters

DSE	Course Code	Course	L	T	P	C
DSE-Elective V	CA25401	Deep Learning	3	1	0	4
	CA25411	Data Visualization	3	1	0	4
DSE Lab-Elective V	CA25402	Deep Learning Lab	0	0	4	2
	CA25412	Data Visualization Lab	0	0	4	2
DSE-Elective VI	CA25403	Digital Gaming	3	1	0	4
	CA25415	Advanced Python Programming	3	1	0	4
DSE Lab-Elective VI	CA25404	Digital Gaming Lab	0	0	4	2
	CA25416	Advanced Python Programming Lab	0	0	4	2
DSE-Elective VII	CA25405	Soft Computing	3	1	0	4
	CA25409	Natural Language Processing	3	1	0	4
DSE-Elective VIII	CA25413	Advanced Data Analytics	3	0	0	3
	CA25421	Reinforcement Learning	3	0	0	3
	CA25423	Feature Engineering	3	0	0	3
DSE Lab-Elective VIII	CA25414	Advanced Data Analytics Lab	0	0	4	2
	CA25422	Reinforcement Learning Lab	0	0	4	2
	CA25424	Feature Engineering Lab	0	0	4	2
DSE-Elective IX	CA25417	Computer Vision	3	0	0	3
	CA25419	Image Processing	3	0	0	3

ANNEXURE B: Data Science

Courses and Labs to be taken from following table in 7th and 8th semester

DSE Electives	Course Code	Course	L	T	P	C
DSE-Elective V	CA25425	No SQL Data Base	3	1	0	4
	CA25431	Cloud Computing	3	1	0	4
DSE Lab- Elective V	CA25426	No SQL Lab	0	0	4	2
	CA25432	Cloud Computing Lab	0	0	4	2
DSE-Elective VI	CA25415	Advanced Python Programming	3	1	0	4
	CA25433	Data PreProcessing and Reporting	3	1	0	4
DSE Lab-Elective VI	CA25416	Advanced Python Programming Lab	0	0	4	2
	CA25434	Data Preprocessing and reporting Lab	0	0	4	2
DSE-Elective VII	CA25405	Soft Computing	3	1	0	4
	CA25427	Data Ethics and Privacy	3	1	0	4
	CA25429	Cryptography &Network Security	3	1	0	4
DSE-Elective VIII	CA25413	Advanced Data Analytics	3	0	0	3
	CA25437	Data Security	3	0	0	3

DSE Lab-Elective VIII	CA25414	Advanced Data Analytics Lab	0	0	4	2
	CA25438	Data security Lab	0	0	4	2
DSE-Elective IX	CA25435	Big Data Analytics	3	0	0	3
	CA25419	Image Processing	3	0	0	3

ANNEXURE C: High Performance Computing

Courses and Labs to be taken from the following table in the 7th and 8th semester

DSE Electives	Course Code	Course	L	T	P	C
DSE-Elective V	CA25441	Massively Parallel Models of Computation	3	1	0	4
DSE Lab- Elective V	CA25442	Massively Parallel Models of Computation Lab	0	0	4	2
DSE-Elective VI	CA25431	Cloud Computing	3	1	0	4
DSE Lab-Elective VI	CA25432	Cloud Computing Lab	0	0	4	2
DSE-Elective VII	CA25439	Advanced Computer Architecture	3	1	0	4
DSE-Elective VIII	CA25443	High Performance Cluster Computing	3	0	0	3
	CA25445	Grid Computing	3	0	0	3
	CA25447	Introduction to Quantum Computing	3	0	0	3
DSE Lab-Elective VIII	CA25444	Cluster Computing Lab	0	0	4	2
	CA25446	Grid Computing Lab	0	0	4	2
	CA25448	Quantum Computing Lab	0	0	4	2
DSE-Elective IX	CA25449	Parallel Algorithm and Computation	3	0	0	3
	CA25451	High-Performance Big Data Computing	3	0	0	3