PROGRAMME COURSE STRUCTURE

BIRLA INSTUTURE OF TECHNOLOGY-MESRA, RANCHI
COURSE STRUCTURE FOR
BACHELOR OF COMPUTER APPLICATION
as per NEP-2020
(w.e.f. Academic Session 2023-24)

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	T	P	C
		THEORY						
First Monsoon	**FIRST**	Pre-requisite course *	PR001	Elementary Mathematics	3	0	0	0
		DSC- Elective		DSC- Elective I	3	0	0	3
		DSC-Course	CN105	Basics of Operating Systems	2	0	0	2
		DSC-Course	CN107	Fundamentals of Computer Science	2	0	0	2
		MDC	MN106	Principles of Management	3	0	0	3
		VAC – Elective		VAC Elective I	2	0	0	2
		SEC-SB Elective		SEC-SB Elective I	2	0	2	3
		VAC – Elective		VAC Elective II	1	0	2	2
		LABORATORIES						
		AECC	MT132	Communication Skills-I	0	0	3	1.5
		DSC Lab		DSC Lab – Elective I	0	0	4	2
		TOTAL						**20.5**

*[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	CN121	Introduction to Data Structures	3	1	0	4
		DSC-Course	CN123	Basics of Digital Computer and Logic Design	3	1	0	4
		MDC	CN131	Mathematics for Computing I	3	1	0	4
		VAC – Elective		VAC Elective III	2	0	0	2
		LABORATORIES						
		SEC-SB Elective		SEC-SB Elective II	0	0	4	2
		AECC	MT133	Communication Skills- II	0	0	3	1.5
		DSC Lab	CN122	Data Structure Lab	0	0	4	2
		Internship/ Dissertation	CN130	Internship or work based vocational courses**	0	0	0	4
		Total			**23.5 (Including summer internship)**			

****Vocational course to be offered during Summer term**

EXIT OPTION WITH CERTIFICATION IN COMPUTER APPLICATIONS
Total Credits I Year [DSC Course:19 MDC:6 SEC-SB:6 VAC:6 AECC:3 Internship:4* = 40+4*] =44

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	CN201	Java Programming	3	0	0	3
		DSC-Course	CN203	Database Management System	3	0	0	3
		DSC-Course	CN205	Concept of Programming Languages	2	0	0	2
		MDC	CN207	Mathematics for Computing II	3	0	0	3
		AECC	MN109	Public speaking and creative writing	1	0	2	2
		SEC-SB		SEC-SB Elective III	2	0	2	3
		LABORATORIES						
		DSC Lab	CN202	Java Lab	0	0	4	2
		DSC Lab	CN204	DBMS Lab	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
Fourth Spring	SECOND	**THEORY**						
		DSC-Course	CN221	Software Engineering	3	0	0	3
		DSC-Course	CN223	Python Programming	3	1	0	4
		DSC-Course	CN225	Computer Networks	3	0	0	3
		DSE-Elective		DSE Elective I	3	0	0	3
		AECC	MN201	Personality Development	2	0	2	3
		LABORATORIES						
		DSC Lab	CN222	Software Engineering Lab	0	0	4	2
		DSC Lab	CN224	Python Programming Lab	0	0	4	2
		Total						**20**

EXIT OPTION WITH DIPLOMAIN IN COMPUTER APPLICATIONS

Total Credits after II Year [DSC+DSE :48 MDC :9 SEC-SB :9 VAC : 6 AECC :8Internship :4* = 80+4*] =84

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	CN301	Fundamentals of Computer Algorithm	3	1	0	4
		DSE-Elective		DSE-Elective II	3	0	0	3
		DSC-Course	CN307	Web Programming	3	0	0	3
		DSC-Course	CN309	Software Testing	3	1	0	4
		LABORATORIES						
		DSE Lab		DSE Lab- Elective II	0	0	4	2
		DSC-Course	CN308	Web Programming Lab	0	0	4	2
		Minor Internship/ Project	CN312	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	CN335	Distributed Computing	3	0	0	3
		DSE-Elective		DSE-Elective IV	3	0	0	3
		DSC-Course	CN341	Introduction to Computer Optimization Techniques	3	0	0	3
		LABORATORIES						
		DSE Lab-Elective		DSE Lab-Elective III	0	0	4	2
		DSE Lab-Elective		DSE Lab-Elective IV	0	0	4	2
			CN344	Minor Project	0	0	0	3
		TOTAL						**20**

EXIT OPTION WITH DEGREE (BCA) Total Credits [I Year + II year +III Year = 44+40 +40= 124]

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	CN407	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	CN470	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 164 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	CN101	Programming and Problem-Solving using C	3	0	0	3
	CN103	Programming and Problem-Solving using C++	3	0	0	3
DSC Lab – Elective I	CN102	C Lab	0	0	4	2
	CN104	C++ Lab	0	0	4	2

VAC Electives

	Course Code	Course	L	T	P	C
VAC Elective I	MN102	Human Values and Professional Ethics	2	0	0	2
	CN109	Environmental Science	2	0	0	2
VAC Elective II	MN103	Yoga	1	0	2	2
	MN104	Physical Education	1	0	2	2
VAC Elective III	MN111	Digital Empowerment	2	0	0	2
	MN112	Emotional Intelligence	2	0	0	2

SEC-SB Electives

	Course Code	Course	L	T	P	C
SEC-SB Elective I	CN111	Office Automation Tools	2	0	2	3
	CN113	Linux administration	2	0	2	3
SEC-SB Elective II	CN126	MATLAB Programming Lab	0	0	4	2
	CN128	Latex Lab	0	0	4	2
SEC-SB Elective III	CN209	Statistics with R	2	0	2	3
	MN203	Computerized Accounting	2	0	2	3

DSE Electives

	Course Code	Course	L	T	P	C
DSE-Elective I	CN227	Introduction to Data Science	3	0	0	3
	CN229	Introduction to Artificial Intelligence	3	0	0	3
	CN231	Enterprise Resource Planning	3	0	0	3
DSE-Elective II	CN303	Introduction to Machine Learning	3	0	0	3
	CN305	Computer Graphics	3	0	0	3
DSE Lab- Elective II	CN304	Machine Learning Lab	0	0	4	2
	CN306	Computer Graphics Lab	0	0	4	2
DSE-Elective III	CN331	Advanced Java Programming	3	1	0	4
	CN333	Data Analytics	3	1	0	4
DSE Lab- Elective III	CN332	Advanced Java Programming Lab	0	0	4	2
	CN334	Data Analytics Lab	0	0	4	2
DSE-Elective IV	CN337	Introduction to Data Mining	3	0	0	3
	CN339	Introduction to IOT	3	0	0	3
DSE Lab- Elective IV	CN338	Data Mining Lab	0	0	4	2
	CN340	IOT Lab	0	0	4	2

ANNEXURE A: Artificial Intelligence and Machine Learning

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	CN401	Deep Learning	3	1	0	4
	CN411	Data Visualization	3	1	0	4
DSE Lab-Elective V	CN402	Deep Learning Lab	0	0	4	2
	CN412	Data Visualization Lab	0	0	4	2
DSE-Elective VI	CN403	Digital Gaming	3	1	0	4
	CN415	Advanced Python Programming	3	1	0	4
DSE Lab-Elective VI	CN404	Digital Gaming Lab	0	0	4	2
	CN416	Advanced Python Programming Lab	0	0	4	2
DSE-Elective VII	CN405	Soft Computing	3	1	0	4
	CN409	Natural Language Processing	3	1	0	4
DSE-Elective VIII	CN413	Advanced Data Analytics	3	0	0	3
	CN421	Reinforcement Learning	3	0	0	3
	CN423	Feature Engineering	3	0	0	3
DSE Lab-Elective VIII	CN414	Advanced Data Analytics Lab	0	0	4	2
	CN422	Reinforcement Learning Lab	0	0	4	2
	CN424	Feature Engineering Lab	0	0	4	2
DSE-Elective IX	CN417	Computer Vision	3	0	0	3
	CN419	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	CN425	No SQL Data Base	3	1	0	4
	CN431	Cloud Computing	3	1	0	4
DSE Lab-Elective V	CN426	No SQL Lab	0	0	4	2
	CN432	Cloud Computing Lab	0	0	4	2
DSE-Elective VI	CN415	Advanced Python Programming	3	1	0	4
	CN433	Data Preprocessing and Reporting	3	1	0	4
DSE Lab-Elective VI	CN416	Advanced Python Programming Lab	0	0	4	2
	CN434	Data Preprocessing and reporting Lab	0	0	4	2
DSE-Elective VII	CN405	Soft Computing	3	1	0	4
	CN427	Data Ethics and Privacy	3	1	0	4
	CN429	Cryptography & Network Security	3	1	0	4
DSE-Elective VIII	CN413	Advanced Data Analytics	3	0	0	3
	CN437	Data Security	3	0	0	3
DSE Lab-Elective VIII	CN414	Advanced Data Analytics Lab	0	0	4	2
	CN438	Data security Lab	0	0	4	2
DSE-Elective IX	CN435	Big Data Analytics	3	0	0	3
	CN419	Image Processing	3	0	0	3

ANNEXURE C: High Performance Computing

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	CN441	Massively Parallel Models of Computation	3	1	0	4
DSE Lab-Elective V	CN442	Massively Parallel Models of Computation Lab	0	0	4	2
DSE-Elective VI	CN431	Cloud Computing	3	1	0	4
DSE Lab-Elective VI	CN432	Cloud Computing Lab	0	0	4	2
DSE-Elective VII	CN439	Advanced Computer Architecture	3	1	0	4
DSE-Elective VIII	CN443	High Performance Cluster Computing	3	0	0	3
	CN445	Grid Computing	3	0	0	3
	CN447	Introduction to Quantum Computing	3	0	0	3
DSE Lab-Elective VIII	CN444	Cluster Computing Lab	0	0	4	2
	CN446	Grid Computing Lab	0	0	4	2
	CN448	Quantum Computing Lab	0	0	4	2
DSE-Elective IX	CN449	Parallel Algorithm and Computation	3	0	0	3
	CN451	High-Performance Big Data Computing	3	0	0	3