


PROGRAMME COURSE STRUCTURE

		BIRLA INSTITUTE OF TECHNOLOGY-MESRA, RANCHI COURSE STRUCTURE FOR B.Sc. (Honours / Honours with Research) Computer Science Discipline-Specific Electives in Artificial Intelligence & Machine Learning / Data Science as per NEP-2020 (w.e.f. Academic Session 2025-26)						
Semester/ Session of Study (Recomm ended)	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	DSC	BC25101	Calculus	3	0	0	3
		DSC	BC25103	Structured and Object Oriented Programming	2	0	0	2
		DSC	BC25105	Digital Systems Design	2	0	0	2
		VAC	CN109	Environmental Science	2	0	0	2
		SEC	BC25107	Quantitative Skills	2	1	0	3
		MDC	MN106	Principles of Management	3	0	0	3
		LABORATORIES						
		DSC	BC25102	Calculus Lab	0	0	2	1
		DSC	BC25104	Structured and Object Oriented Programming Lab	0	0	4	2
		DSC	BC25106	Digital Systems Design Lab	0	0	2	1
		AECC	HS24131	Communication Skills 1	0	0	3	1.5
		TOTAL				20.5		

DSC: 11
VAC: 2
AECC: 1.5
SEC: 3
MDC: 3

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	BC25107	Differential Equations and Transforms	3	1	0	4	
		DSC	BC25109	Data Structures and Algorithms	3	0	0	3	
		DSC	BC25111	Operating Systems	2	0	0	2	
		DSC	BC25113	Programming in Java	3	0	0	3	
		VAC	HS24211	Indian Knowledge System	2	0	0	2	
		LABORATORIES							
		DSC	BC25110	Data Structures and Algorithms Lab	0	0	4	2	
		DSC	BC25112	Operating Systems Lab	0	0	2	1	
		DSC	BC25114	Programming in Java Lab	0	0	4	2	
		AECC	HS24133	Communication Skills II	0	0	3	1.5	
		Total				20.5			

DSC: 17

AECC: 1.5

VAC: 2

EXIT OPTION AFTER FIRST YEAR WITH CERTIFICATION

***Note** - Two skill based Vocational courses of 2 credits will be offered at the end of the 1st Year (Level 1) and mandatory for students taking exit after 1st year. However these courses will be optional and non-credit for other students.

Courses at the end of First Year:

BC25116 Office Automation Tools – 2 Credits (L0-T0-P4)

BC25118 MATLAB Programming – 2 Credits (L0-T0-P4)

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	BC25201	Complex Variables and Linear Algebra	3	1	0	4	
		DSC	BC25203	Artificial Intelligence	3	0	0	3	
		DSC	BC25205	Programming in Python	2	0	0	2	
		DSC	BC25207	Database Management Systems	2	0	0	2	
		AECC	BF213	Effective Writing and Presentation Skills	1	1	0	2	
		SEC	BC25209	Qualitative Skills	2	1	0	3	
		LABORATORIES							
		DSC	BC25206	Programming in Python Lab	0	0	4	2	
		DSC	BC25208	Database Management Systems Lab	0	0	4	2	
		TOTAL			20				

DSC: 15
AECC: 2
SEC: 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
					L (Periods /week)	T (Periods /week)	P (Periods /week)	C
Fourth Spring	SECOND	THEORY						
		DSC	BC25211	Probability and Statistics	3	0	0	3
		DSC	BC25213	Design and Analysis of Algorithms	3	0	0	3
		DSE(AI&ML and DS)	BC25215	Data Mining	3	0	0	3
		DSE(AI&ML)	BC25217	Machine Learning	3	0	0	3
		DSE(AI&ML)	BC25219	Human Computer Interaction	3	1	0	4
		DSE(DS)	BC25221	Data Science Concepts	3	0	0	3
		DSE (DS)	BC25223	Data Visualization	3	1	0	4
		MDC	BC25225	Entrepreneurship Development	3	0	0	3
		LABORATORIES						
		DSC	BC25212	Probability and Statistics Lab	0	0	2	1
		DSC	BC25214	Design and Analysis of Algorithms Lab	0	0	2	1
		DSE(AI&ML and DS)	BC25216	Data Mining Lab	0	0	2	1
		DSE(AI&ML)	BC25218	Machine Learning Lab	0	0	2	1
		DSE(DS)	BC25222	Data Science Using R Lab	0	0	2	1
		Total			23			

DSC: 8

DSE (AI & ML) and DSE (DS): 12

MDC: 3

EXIT OPTION AFTER SECOND YEAR WITH UG DIPLOMA

***Note** - Two skill based Vocational courses of 2 credits will be offered at the end of the 2nd Year (Level-2) and mandatory for students taking exit after 2nd year. However these courses will be optional and non-credit for other students.

Courses at the end of Second Year:

BC25224 Linux Programming - 2 Credits (L0-T0-P4)

BC25226 Programming in R - 2 Credits (L0-T0-P4)

Semester/ Session of Study (Recomm ended)	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	BC25301	Computer Organization and Architecture	3	0	0	3
		DSC	BC25303	Software Engineering	2	0	0	2
		DSE (AI & ML)	BC25305	Image Processing	3	0	0	3
		DSE(AI&ML)	BC25307	Deep Learning	3	0	0	3
		DSE (DS)	BC25309	Exploratory Data Analytics	3	0	0	3
		DSE(DS)	BC25311	Big Data Analytics	3	0	0	3
		VAC	MT24304	Constitution of India	2	0	0	2
		MDC	BF303	Security Analysis and Portfolio Management	3	0	0	3
		LABORATORIES						
		DSC	BC25304	Software Engineering Lab	0	0	2	1
		DSE (AI & ML)	BC25306	Image Processing Lab	0	0	2	1
		DSE (AI&ML)	BC25308	Deep Learning Lab	0	0	2	1
		DSE (DS)	BC25310	Exploratory Data Analytics Lab	0	0	2	1
		DSE (DS)	BC25312	Big Data Analytics Lab	0	0	2	1
		TOTAL						19

DSC: 6

DSE (AI & ML) and DSE (DS): 8

VAC: 2

MDC: 3

Semester/ Session of Study (Recomm ended)	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						
		DSC	BC25313	Computer Networks	2	0	0	2
		DSC	BC25315	Web Programming	3	0	0	3
		DSE (AI&ML)	BC25317	Natural Language Processing	3	0	0	3
		DSE (DS)	BC25217	Machine Learning	3	0	0	3
		AECC	BF207	Creativity and Critical Thinking Skills	2	1	0	3
		SEC	BC25319	Spreadsheet Skills	2	1	0	3
		VAC	BC25321	Co-Curricular and Social Activities	0	0	0	2
		Minor Project	BC25323	Minor Project	0	0	0	2
		LABORATORIES						
		DSC	BC25314	Computer Networks Lab	0	0	2	1
		DSC	BC25316	Web Programming Lab	0	0	2	1
		DSE (AI&ML)	BC25318	Natural Language Processing Lab	0	0	2	1
		DSE (DS)	BC25218	Machine Learning Lab	0	0	2	1
		TOTAL			21			

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							
		DSC	BC25401	Theory of Computation	3	0	0	3	
		DSC	BC25403	Cryptography and Network Security	3	0	0	3	
Seventh Monsoon	FOURTH	DSC	BC25405	Full Stack Application Development	3	0	0	3	
		DSC	BC25407	Compiler Design	3	0	0	3	
		DSE 1		Select 1 from DSE 1	3	0	0	3	
		DSE 2		Select 1 from DSE 2	3	1	0	4	
		LABORATORIES							
		DSC	BC25404	Cryptography and Network Security Lab	0	0	4	2	
		DSC	BC25406	Full Stack Application Development Lab	0	0	2	1	
		DSC	BC25408	Compiler Design Lab	0	0	2	1	
		DSE 1		Select 1 from DSE 1	0	0	2	1	
				TOTAL					

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			
					LABORATORIES			
Eighth Spring	FOURTH	Research Project / Internship/	BC25419	Research Project / Internship with Viva-voce and Seminar Presentation	0	0	0	12
	TOTAL							12

Project: 12

Students who secure 7.5 CGPA and above at the end of sixth semester are eligible to undertake research stream in the fourth year.

BACHELORS DEGREE WITH HONOURS/HONOURS WITH RESEARCH

Acronyms Expanded

- **AECC : Ability Enhancement Compulsory Course**
- **DSC : Discipline Specific Core (Course)**
- **SEC : Skill Enhancement Course**
- **VAC : Value Added Course**
- **MDC : Multidisciplinary Course**
- **DSE : Discipline Specific Elective**
- **L-T-P : Lecture - Tutorial - Practical (s)**

