

**B. TECH. (DATA SCIENCE AND ARTIFICIAL INTELLIGENCE)
COMPONENT WISE DISTRIBUTION**

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	57
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		16	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	40-48	87-91	40	88
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		10	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
CORE	2	2	2	2	
	Total	150-160		156-159	
	MSC/DHC	18/20		18/20	
	Grand Total			174/179	

**MEHTA FAMILY SCHOOL FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : 125 **B. Tech. (Data Science and Artificial Intelligence)**
Department : DSAI **Mehta Family School for Data Science and Artificial Intelligence**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	23	46
2	23/24	21/22	44/46
3	19/20	21	40/41
4	20	6	26
Grand Total			156/159
Total with MSC/DHC	With addition 18-20 credits		174/179

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

List of Program Elective Courses

3rd Year Electives

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	DAL-301	Casual Inference	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	DAL-302	Information Theory and Cryptography	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	DAL-303	Information Retrieval	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	DAL-304	Computer Architecture for AI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	DAL-305	Intelligent Cloud Computing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	DAL-306	Intelligent and Learning Agents	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	DAL-307	Intelligent Robotics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	DAL-308	Applications of AI in Healthcare	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

4th Year Electives

9.	DAL-401	E-commerce	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	DAL-402	Security and Privacy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	DAL-403	AI in Neuroscience & Cognitive Behaviour	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	DAL-404	AI based Diagnostics tools	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	DAL-565	Computer Vision	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	DAL -559	Stochastic Processes and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	DAL -628	Evolutionary Algorithms	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	DAL -558	Data Stream Mining	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	DAL -564	AI and Medical Physics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	DAL -562	AI for Investment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	DAL -567	Introduction to Materials Informatics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	DAL -561	AI for Earth Observations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	DAL -519	Social Network Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	DAL -568	ML and AI Applications in Earth	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

		Sciences												
23.	DAL -571	Big Data Analytics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	DAL -576	Data Science in Bioinformatics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	DAL -579	Leveraging Data Science for Finance	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26.	DAL -581	Advanced Applications of Pattern Recognition	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	DAL -582	Recommended Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28.	DAL -583	Data-Driven Analytics for Smart Transportation Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
29.	DAL -5xx	AI for Fluid Mechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A (Computer Vision and Image Processing)														
1.	DAT-101	Computer Vision	TEB	2	0	0	4	-	-	-	-	-	100	-
2.	DAT-102	Image Enhancement Techniques	TEB	2	0	0	4	-	-	-	-	-	100	-
3.	DAT-103	AI based earth imaging	TEB	2	0	0	4	-	-	-	-	-	100	-
TEB-B (AI for Sustainable Development Goals (SDG))														
4.	DAT-104	AI for Energy	TEB	2	0	0	4	-	-	-	-	-	100	-
5.	DAT-105	AI for Healthcare	TEB	2	0	0	4	-	-	-	-	-	100	-
6.	DAT-106	AI for Smart Transportation	TEB	2	0	0	4	-	-	-	-	-	100	-
TEB-C (AI for Economics)														
7.	DAT-107	AI for e-commerce	TEB	2	0	0	4	-	-	-	-	-	100	-
8.	DAT-108	AI Data Mining and Warehousing for online market places	TEB	2	0	0	4	-	-	-	-	-	100	-
9.	DAT-109	AI for asset management	TEB	2	0	0	4	-	-	-	-	-	100	-

Minor Specialization Courses

S.No.	Code	Course title	Semester	Credits
1	DAC-102	Computer Organization and Architecture	Spring	4
2	DAC-104	Programming in Python	Spring	4
3	DAC-203	Artificial Intelligence	Autumn	4
4	DAC-202	Applied Machine Learning	Spring	4
5	DAC-303	Computer Networks	Autumn	4

Departmental Honours Courses

Sub. Code	Title	Credits
DAL-507	Advanced Data Structures and Algorithms	4
DAL-xxx	Statistical Machine Learning	4
DAL-503	Hardware Architectures for AI	4
DAL-xxx	AI Driven Non-linear Dynamics	4
DAL-xxx	Optimization in Machine Learning	4
All PG PECs / Pre-PhD courses of MFS		