Curriculum

As a specialized branch of the global technology, the B.Tech in AI & DS have a huge scope of growth with ample opportunities to make a mark. The well-researched and carefully crafted course curriculum along with six specializations designed keeping the future of the AI & DS will provide ample opportunities for the students to become master of the technology.

B.Tech Artificial Intelligence and Data Science Course Structure (2021-22)

S.No	Category	Subject Details	L-T-P-S	Credits
1	HSS	Integrated Professional English	0-0-4-0	2
2	HSS	English Proficiency	0-0-4-0	2
3	HSS	Professional Communication Skills	0-0-4-0	2
4	HSS	Corporate Communication Skills	0-0-4-0	2
5	HSS	Aptitude Builder	0-0-4-0	2
6	HSS	Foreign Language Elective	2-0-0-0	2
7	HSS	Indian Heritage and Culture	2-0-0-0	0
8	HSS	Indian Constitution	2-0-0-0	0
9	HSS	Ecology & Environment	2-0-0-0	0
10	HSS	Universal Human Values & Professional Ethics	2-0-0-0	0
11	HSS	Entrepreneurship	2-0-0-0	0
12	BS	Design Thinking and Innovation - 1	1-0-0-4	2
13	BS	Design Thinking and Innovation - 2	1-0-0-4	2
14	BS	User Centric Design Techniques	1-0-0-4	2
15	BS	Mathematics for Computing	2-2-0-2	4.5
16	BS	Mathematics for Engineers	2-1-0-0	3
17	BS	Mathematical Programming	2-1-0-0	3
18	BS	Probability and Statistics	2-1-0-0	3
19	BS	Physics	3-0-2-0	4
20	BS	Engineering Chemistry	3-0-2-0	4
21	ES	Computational Thinking for Design	3-0-2-6	5.5
22	ES	Data Structures	3-0-2-3	4.75
23	ES	Object Oriented Programming	3-0-2-3	4.75
24	ES	Design through Visual Programming	1-0-0-4	2
25	ES	Design Tools Workshop - 1	0-0-4-0	2
26	ES	Design Tools Workshop - 2	0-0-4-0	2
27	ES	Digital Logic & Processors	3-0-2-0	4
28	ES	Design and Analysis of Algorithms	3-0-2-0	4
29	ES	Enterprise Programming	3-0-2-4	5

30	PC	Introduction to AI	2-1-0-0	3
31	PC	Computer Vision & Perception	3-0-2-2	4.5
32	PC	Machine Learning	3-0-2-2	4.5
33	PC	Deep Learning	3-0-2-0	4
34	PC	Data Science and Visualization	3-0-2-2	4.5
35	PC	DWH & DM	3-0-2-0	4
36	PC	Big Data Engineering	3-0-2-2	4.5
37	PE	PE1	2-0-2-0	3
38	PE	PE2	2-0-2-2	3.5
39	PE	PE3	2-0-0-4	3
40	PE	PE4	2-0-2-0	3
41	PE	PE5	3-0-0-0	3
42	FC	Flexi Core - 1	3-0-2-0	4
43	FC	Flexi Core - 1	3-0-2-0	4
44	OE	Open Elective -1	3-0-0-0	3
45	OE	Open Elective -2	3-0-0-0	3
46	OE	Open Elective -3 (Management Elective)	2-0-0-0	2
47	PR	Social Internship	0-0-0-8	2
48	PR	Technical Internship	0-0-0-8	2
49	PR	Midgrade Capstone Project 1	0-0-0-8	2
50	PR	Midgrade Capstone Project 2	0-0-0-8	2
51	PR	Practice School/ Capstone Project 1	0-0-0-24	6
52	PR	Internship/ Capstone Project 2	0-0-0-24	6
53	PTA	Technical Proficiency / Entrepreneurial Incubation	0-0-0-12	3
54	PTA	Technical Proficiency / Entrepreneurial Incubation	0-0-0-12	3
57	PTA	Technical Proficiency / Entrepreneurial Incubation	0-0-0-12	0
58	PTA	Technical Proficiency / Entrepreneurial Incubation	0-0-0-12	0
59	PTA	Technical Skilling -1 (Java)	0-0-0-4	1
60	PTA	Technical Skilling -2 (IT Essentials)	0-0-0-4	1
		Total Credits		162

Categorization of Courses Offered

Mathematics

S.NO	Course Name	L	T	P	S	Credits
1	Mathematics for Computing	2	2	0	2	4.5
2	Mathematics for Engineers	2	1	0	0	3

3	Probability & Statistics for Data Science	2	1	0	0	3
4	Mathematical Programming	2	1	0	0	3

Programming

S.NO	Course Name	L	T	P	S	Credits
1	Computational Thinking for Design (C Language)	3	0	2	6	5.5
2	Data Structures Design (Python)	3	0	2	3	4.75
3	Object Oriented Programming System (Python)	3	0	2	3	4.75
4	Design and Analysis of Algorithms	3	0	2	0	4
5	Technical Skilling - 1 (Core Java)	0	0	0	4	1
6	Enterprise Programming	3	0	2	0	4

Core Courses

S.NO	Course Name	L	T	P	S	Credits
1	Introduction to Artificial Intelligence	2	0	0	0	2
2	Machine Learning	3	0	2	2	4.5
3	Data Science and Visualization	3	0	2	2	4.5
4	Data Warehouse and Data Mining	3	0	2	0	4
5	Deep Learning	3	0	2	0	4
6	Computer Vision & Perception	3	0	2	2	4.5
7	Big Data Engineering	3	0	2	2	4.5

Flexi Core (Two Courses to be selected)

	Course Name	L	T	P	S	Credits
1	Continuous Delivery & DevOps	3	0	2	0	4
2	Cloud & Edge Computing	3	0	2	0	4
3	Automata Theory & Compiler Design	3	0	2	0	4
4	Digital Forensics	3	0	2	0	4
5	Visual Programming and HCI (UI/UX)	3	0	2	0	4
6	IoT	3	0	2	0	4
7	Web Engineering	3	0	2	0	4
8	Network Security	3	0	2	0	4

Professional Specializations

Stream 1
Autonomous Systems
Humans & Intelligent Machines

Robotics Software
Automated System Engineering
Intelligent Agents
Intelligent Control and Cognitive Systems
Autonomous Drones
Sensor Fusion

Stream 2
Medical intelligence
Convolutional Neural Networks
Data Science in Medical Imaging
Data Science for Genomics
Drug Discovery using ML & DS
Predictive Analytics in Healthcare
Precision Medicine & Preventive Healthcare
Recommendation Systems
Public Healthcare System

Stream 3
IoT Analytics
Sensors & Actuators
Analytics on the Edge
Video Analytics for Surveillance & Safety
Data lake storage for IoT Data management
Precision Agriculture

Stream 4
Computational Intelligence
Fuzzy Systems
Artificial Neural Networks
Soft Computing
Swarm and Evolutionary Computing
Anomaly Detection

Stream 5
Perception and Language
Human-AI Interaction
Speech Processing
Natural language processing

Image and video processing
AI in Search Engine

Stream 6 **Social & Digital Media Analytics**
Sentiment Analysis
Opinion Mining & Recommender Systems
Social Media Marketing Analytics
Digital Media Analytics
Intelligent Social media Monitoring Systems

Communication and Soft Skills

S.NO	Course Name	L	T	P	S	Credits
1	Integrated Professional English	0	0	4	0	2
2	English Proficiency	0	0	4	0	2
3	Professional Communication Skills	0	0	4	0	2
4	Corporate Communication Skills	0	0	4	0	1
5	Aptitude Builder	0	0	4	0	2
6	Universal Human Values & Professional Ethics	2	0	0	0	2

Projects

S.NO	Course Name	L	T	P	S	Credits
1	Midgrade Capstone Project - Core Stream	0	0	0	8	2
2	Midgrade Capstone Project - PE Stream	0	0	0	8	2
3	Capstone Project 1	0	0	0	24	6
4	Internship/ Capstone Project 2	0	0	0	24	6

Design Thinking

S.NO	Course Name	L	T	P	S	Credits
1	Design Thinking and Innovation-I	1	0	0	4	2
2	Design Thinking and Innovation - 2	1	0	0	4	2
3	Design through Visual Programming	1	0	0	4	2

Technical Skilling

S.NO	Course Name	L	T	P	S	Credits
1	Technical Skilling 2 - IT Essentials	0	0	0	4	1
2	Technical Proficiency - 1	0	0	0	12	3

3	Technical Proficiency - 2	0	0	0	12	3

Skill Development

Apart from the core engineering subjects, A student is also exposed and well versed with the existing tools through skill part of a course apart from trying to design and implement their own tool. Some of the Tools and frameworks the students will be learning are as follows;

- Tensorflow
- Pytorch
- H20
- IBM Watson
- Keras
- SAS
- Apache Spark
- BigML

Design Based Learning

Learning through Design/Implementation which is the course delivery practice in our university for majority of the courses which is one of the unique selling points will make the student competent in getting high end jobs in the domain.

Startup Culture

AI&DS is an area which can be seen not just an area with Job Potential but also with startup potential. With a blend of TBI, ACIC and Incubation support we have in our university, the students will be encouraged and guided by Industry mentors to inculcate the startup culture in AI & DS.

Capstone Project

Capstone projects will help the student to consolidate the concepts learned in multiple subjects for developing a tool in AI & DS. The student will be using all the knowledge and practical exposure to solve a real-world problem by developing his own tool or solution.