



# भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान भोपाल

**Indian Institute of Science Education and Research Bhopal**

(Estb. by Ministry of Education, Govt. of India)

Department of Data Science and Engineering

## Curriculum for B.Tech in Data Science and Engineering (DSE)

Semester	Course No.	Course Name	Credits	Total
I	CHM 101	General Chemistry	3	21
	MTH 101	Calculus of One Variable	3	
	PHY 101	Mechanics	3	
	EES 101	Introduction to Earth Sciences	3	
	CHE 103	Engineering Design And Drawing	3	
	HSS 101	English for Communication	2	
	PHY 103	General Physics Laboratory-I	1	
	BIO 101* or ECO 101	ECO 101* BIOLOGY I: Biomolecules or Principles of Economics-I	3	
II	CHM 112	Basic Organic Chemistry-I	3	19
	MTH 102	Linear Algebra	3	
	PHY 102	Modern Physics	3	
	EES 102	Introduction to Environmental Sciences	3	
	ECS 102	Introduction to Programming	3	
	CHM 114	Chemistry Laboratory-I	1	
BIO 102* or ECO 102*	Biology II: Fundamental of Cell Biology OR Principles of Economics-II	3		
III		Engineering Mathematics <sup>1</sup>	3	18
		Probability and Random Processes	3	
		Data Structures and Algorithm	3	
		Signals and Systems	3	
		Optimization Techniques	3	
		Data Structures Lab	3	
		Database Management System	3	
IV		Advanced Programming	3	17
		Algorithms	3	
		Data Science in Practice	4	
		Machine Learning	4	
		Computer Organization	4	
V		Deep Learning	4	20
		Deep Learning Lab	2	
		Computer Vision	4	
		Artificial Intelligence	3	

<sup>1</sup> Courses highlighted in red color are replaced with the courses in existing BS in DSE curriculum

		Discrete Mathematics	3	
		DSE Elective	4	16
VI		Natural Language Processing	4	
		Open Elective	4	
		Open Elective	4	
VII		DSE Elective	4	20
		DSE Elective	4	
		Open Elective	4	
		Open Elective	4	
		Open Elective	4	
VIII		B.Tech Thesis		18

**Curriculum for an additional year to obtain B.Tech-M. Tech in DSE**

IX	#ECO 500	Law Related to Intellectual Property and Patents	1	19
	DSE ***	DSE Electives (2 courses)	2*4 = 8	
	DSE 501	M. Tech Thesis	10	
X	DSE 502	M. Tech Thesis	20	20

**List of DSE Elective Courses (B. Tech and B.Tech-M.Tech)**

1) Natural Language Processing (NLP)	16) Reinforcement Learning
2) Transfer Learning in Computer Vision (CV)	17) Game Theory
3) Advanced NLP	18) 3D Vision
4) Biometrics	19) 3D Deep Learning and Applications
5) Biomedical Text Mining	20) Signal Processing for Machine Learning
6) Machine Learning for Bio-Pharma	21) AI for Sports Analytics
7) Digital Image Processing	22) AI for Climate Modeling
8) Data Analysis and Structure of GeoScience	23) Applied Accelerated AI
9) Spatial Data Science and Applications	24) Data Visualization
10) Advanced Deep Learning	25) Cloud Computing
11) Social Computing	26) Scalable Machine Learning
12) Generative Artificial Intelligence (AI)	27) Human-Computer Interaction
13) Ethics in AI/Responsible AI	28) Statistical Learning Theory
14) Advance Biometrics and Pattern Analysis	29) Online Learning
15) Deep Learning for CV	