

M.Tech. in Data Science

University-Style Syllabus (2 Years / 4 Semesters)

Programmer Duration: 2 Years (4 Semesters)

Programmer Level: Postgraduate (M.Tech.)

Credits: 68–80 (Typical AICTE/NEP Pattern)

Semester I

Subject Code	Subject	L	T	P	Credits
MDS101	Mathematical Foundations for Data Science	3	1	0	4
MDS102	Probability, Statistics and Linear Algebra	3	1	0	4
MDS103	Programming for Data Science (Python & R)	3	0	2	4
MDS104	Database Systems and Data Warehousing	3	0	2	4
MDS105	Research Methodology	2	0	2	3
MDS106	Data Science Laboratory – I	0	0	4	2

Total Credits: 21

Semester II

Subject Code	Subject	L	T	P	Credits
MDS201	Machine Learning	3	1	0	4
MDS202	Big Data Analytics	3	0	2	4
MDS203	Data Visualization and Business Intelligence	3	0	2	4

Subject Code	Subject	L	T	P	Credits
MDS204	Cloud Computing for Data Science	3	0	2	4
MDS205	Data Science Laboratory – II	0	0	4	2
MDS206	Seminar – I	0	0	2	1

Total Credits: 19

Semester III

Subject Code	Subject	L	T	P	Credits
MDS301	Deep Learning	3	1	0	4
MDS302	Natural Language Processing	3	0	2	4
MDS303	Artificial Intelligence and Intelligent Systems	3	0	2	4
MDS304	Elective – I	3	0	0	3
MDS305	Dissertation Phase – I	0	0	12	8

Elective – I (Choose One)

- MDS311 – Computer Vision
- MDS312 – Reinforcement Learning
- MDS313 – Time Series Analysis
- MDS314 – Data Mining
- MDS315 – Internet of Things Analytics

Total Credits: 23

Semester IV

Subject Code	Subject	L	T	P	Credits

Subject Code	Subject	L	T	P	Credits
MDS401	Dissertation Phase – II	0	0	24	16
MDS402	Viva Voce	0	0	2	2
MDS403	Industrial Internship	0	0	8	4

Total Credits: 22

Laboratory Courses

Code	Laboratory
MDS106	Data Science Laboratory – I
MDS205	Data Science Laboratory – II
MDS305	Research and Dissertation Work
MDS401	Dissertation and Project Implementation

Detailed Unit-Wise Syllabus

MDS101 – Mathematical Foundations for Data Science

Unit I

- Linear Algebra
- Matrices and Vector Spaces

Unit II

- Calculus
- Optimization Techniques

Unit III

- Probability Theory

Unit IV

- Statistical Inference

Unit V

- Numerical Methods for Data Science
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MDS201 – Machine Learning

Unit I

- Supervised Learning
- Regression

Unit II

- Classification Algorithms

Unit III

- Unsupervised Learning
- Clustering

Unit IV

- Ensemble Methods

Unit V

- Model Evaluation and Hyper parameter Tuning
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MDS202 – Big Data Analytics

- Hadoop Ecosystem
- Spark Framework
- Distributed Data Processing
- No SQL Databases
- Stream Processing

MDS301 – Deep Learning

- Artificial Neural Networks
 - Convolution Neural Networks (CNN)
 - Recurrent Neural Networks (RNN)
 - Transformers
 - Model Deployment
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Practical List

Students should perform practical exercises such as:

- Python Programming for Data Analysis
 - R Programming
 - SQL and NoSQL Database Operations
 - Data Cleaning and Preprocessing
 - Exploratory Data Analysis (EDA)
 - Machine Learning Model Development
 - Deep Learning using Tensor Flow/Pie Torch
 - Big Data Processing with Hadoop and Spark
 - Dashboard Development with Power BI/Tableau
 - Cloud-based Data Analytics
 - Model Deployment using Docker and APIs
 - Capstone Data Science Project
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Examination Scheme

Component	Marks
End Semester Examination	70
Internal Assessment	30
Practical Examination	100
Seminar	100
Dissertation	300

Component	Marks
Viva Voce	100

Recommended Reference Books

- Hands-On Machine Learning with Scikit-Learn, Keras, and Tensor Flow
- Introduction to Statistical Learning
- Deep Learning
- Python for Data Analysis
- Mining of Massive Datasets

Programme Outcomes

Upon successful completion of the programme, graduates will be able to:

1. Apply advanced mathematical and statistical techniques for data analysis.
2. Design and deploy machine learning and deep learning models.
3. Analyze large-scale structured and unstructured datasets.
4. Build secure, scalable, and cloud-enabled data science solutions.
5. Develop data-driven decision support systems.
6. Conduct independent research in data science and artificial intelligence.
7. Lead analytics and AI projects in industry, government, and academia.
8. Pursue doctoral research or advanced professional careers in Data Science, AI, and Analytics.