

DEPARTMENT OF
INFORMATION TECHNOLOGY

MASTER OF TECHNOLOGY

in

DATA SCIENCE

(Professional)

2024



INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
BHOPAL, INDIA

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Postgraduate Course

The postgraduate course serves as a critical driver of a nation's research progress and advancement, representing a dynamic entity that necessitates continuous adaptation to uphold the excellence of research and development. Our institution is proud to offer a comprehensive M.Tech program in Data Science under the Department of Information Technology, spanning three years. The academic calendar is structured into distinct odd semesters (July to December) and even semesters (January to June) for each academic session. This program equips students to gain the analytical, interpretive, and inferential abilities necessary to draw conclusions from datasets. This is a multidisciplinary program where intake is from various disciplines of graduation. The planned curriculum takes into account the variety of students, industry needs, and cutting-edge technologies that data scientists can access while highlighting the fundamental ideas of data science. This program enriches students with professional ethics, and entrepreneurial skills. Also, the curriculum is designed to include a balance of functional knowledge as well as practical learning spread over six semesters covering Mathematics, Statistics, Computer programming, and emerging topics such as Big Data Analytics, Deep Learning, and Data Modelling tools to deal with large-scale data.

1 Program Educational Objectives [PEOs]

1. **PEO1:** Graduates will be well-versed in the fundamentals and latest developments in Data Science, Machine Learning, Artificial Intelligence, and Programming.
2. **PEO2:** To create an academically conducive environment to learn engineering skills in domains such as Data Analytics, Data Modelling, Data Visualization, and Allied Technologies.
3. **PEO3:** To apply their mathematical, statistical, and programming skills to analyze and interpret large volumes of data and extract relevant information from it.

2 Program Outcomes [POs]

PO1: Ability to apply theoretical principles and practical knowledge to the development, design, and analysis of computing systems and applications to challenges from various disciplinary perspectives.

PO2: Ability to contribute to the research community by producing high-quality research outputs, such as publications, conference presentations, and innovations that contribute to the advancement of the field.

PO3: Ability to demonstrate advanced technical skills and proficiency in Data Science to solve real-life problems in various fields of Engineering, Physical and Natural Sciences.

3 Curriculum Structure

Teaching of the courses shall be reckoned in credits. Credits are assigned to the courses based on a general pattern as shown in Table 1:

Table 1: Definition of Credits

1 hour of Lecture (L) per week	1 Credit
1 hour of Tutorial (T) per week	1 Credit
2 hours of Laboratory (P) per week	1 Credit

A total of 78 Credits is required for this Program and the distribution of Credits of the program is shown in Table 2.

Table 2: Distribution of Credits Information

Semester	Periods Per Week			Credits
	L	T	P	
First Semester	9	3	6	15
Second Semester	9	2	4	13
Third Semester	10	2	4	14
Fourth Semester	-	0	22	11
Fifth Semester	-	-	22	11
Sixth Semester	-	-	28	14
Total	28	07	86	78

The credit structure of each course is given in L-T-P form (e.g., 2-1-0). The numbers corresponding to L, T, and P denote the contact hours per week for Lecture, Tutorial, and Practical respectively.

3.1 Definition of Course Code

Course Code Conversion is carried out according to the scheme mentioned in Figure 1.

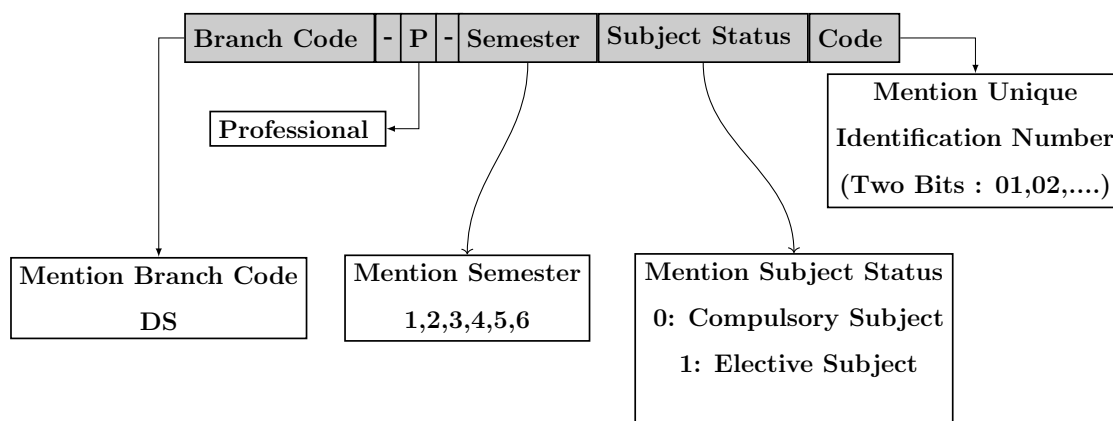


Figure 1: Course Code Conversion

3.2 Scheme

Semester-wise scheme and credit distribution mention in Table 3-10.

Table 3: First Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-1001	Mathematical Foundation of Data Science	3	1	-	4
DS-P-1002	Programming Practices	3	-	2	4
DS-P-1003	Data Warehousing and Mining	3	1	-	4
DS-P-1004	Research Innovation and Entrepreneurship	-	1	2	2
DS-P-1005	DS Lab - I	-	-	2	1
Total L = 9, T = 3, P = 6		Total Credit			15

Table 4: Second Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-2001	Artificial Intelligence	3	-	2	4
DS-P-2002	Stochastic Models	3	1	-	4
DS-P-21XX	Elective - I	3	1	-	4
DS-P-2004	DS Lab - II	-	-	2	1
Total L = 9, T = 2, P = 4		Total Credits			13

Note- XX replaced with Subject code mentioned in Table 9

Table 5: Third Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-3001	Machine Learning	3	-	2	4
DS-P-3002	Big Data and Data Visualization	3	-	2	4
DS-P-31XX	Elective - II	2	1	-	3
DS-P-31XX	Elective - III	2	1	-	3
Total L = 10, T = 2, P = 4		Total Credits			14

Note- XX replaced with Subject code mentioned in Table 10.

Table 6: Fourth Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-4001	Dissertation Phase - I	-	-	22	11
Total L = 0, T = 0, P = 22				Total Credits	11

Table 7: Fifth Semester scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-5001	Dissertation Phase - II	-	-	22	11
Total L = 0, T = 0, P = 22				Total Credits	11

Table 8: Sixth Semester

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
DS-P-6001	Dissertation Phase - III	-	-	28	14
Total L = 0, T = 0, P = 28				Total Credits	14

3.3 Elective Subjects

Table 9: Subjects for Elective - I

Course Code	Subject Name
DS-P-2101	Information Retrieval
DS-P-2102	Distributed Computing
DS-P-2103	Next-Generation Database
DS-P-2104	Expert Systems
DS-P-2105	Advance Data Structures and Algorithms
DS-P-2106	Internet of Things
DS-P-2107	Deep Learning
DS-P-2108	Matrix Computation
DS-P-2109	Cognitive Computing

Table 10: Subjects for Elective -II and Elective - III)

Course Code	Subject Name
DS-P-3101	Blockchain Technologies
DS-P-3102	Data Science for Bio-Informatics
DS-P-3103	Time-Series Data Analytics
DS-P-3104	Web and Database Security
DS-P-3105	Predictive Analytics and Segmentation
DS-P-3106	Stream Processing and Analytics
DS-P-3107	Video Analytics
DS-P-3108	Natural Language Processing
DS-P-3109	Social Network Analysis
DS-P-3110	Foundation of Robotics
DS-P-3111	Real-Time Data Analysis
DS-P-3112	Recommender Systems
DS-P-3113	Cloud Computing
DS-P-3114	Graphs and Matrices
DS-P-3115	Image Processing and Computer Vision
DS-P-3116	Pattern Recognition for Data Science

