

FACULTY OF COMPUTING AND ENGINEERING SCIENCES

Master of Science in Data Science

The MS (Data Science) program is of 2-years duration offered in the evening. It requires 30 credit hours including 3 core courses, and 2 specialized data science courses. The student has the option to complete MS through course work only or with research. If student opts for course work only, he/she is required to complete 10 courses of 3 Credit hours each. Else, the student is required to complete 8 courses (24 credit hours), and Two Independent Research Study (6 credit hours) OR a thesis (6 credit hours).

The maximum time limit to complete the MS (Data Science) degree is 4 years.

Why Study Data Science?

The amount of data is growing so rapidly as well as its significance in the emerging societal setups such as the pervasive Internet of Things. The way one imagines data is going to change in the coming years. Both Big Data Analytics and pervasive computing hinge on the principle axis of data analytics. MS (Data Science) program is going to be relevant in terms of job creation and artisanal smart business generation. Graduates from this program would definitely avail the early-bird advantage.

Program Objectives

The MS (Data Science) program has been designed to give students the option to be part of a data science endeavour that begins with the identification of business processes, determination of data provenance and ownership, understanding the ecosystem of the business decisions, skill sets and tools that shape the data, making data amenable to analytics, identifying sub-problems, recognizing the technology matrix required for problem resolution, creating incrementally-complex data-driven models and then maintaining them to ultimately leverage them for business growth.

Individual objectives include:

- To equip students to transform data into actionable insights to make complex decisions.
- To enable students to understand and analyze problems and arrive at computable solutions.
- To expose students to the set of technologies that match those solutions.
- To gain hands-on experience on data-centric tools for statistical analysis, visualization and big data applications at the same rigorous scale as in a practical data science project.
- To understand the implications of handling data in terms of data security and business ethics.

First Year

First Semester

DSC 5101	Statistical and Mathematical Methods for Data Science
DSC 5102	Tools and Techniques in Data Science
DSC xxxx	Elective-I

Second Semester

DSC 5201	Machine Learning
DSC xxxx	Specialization-Elective-I
DSC xxxx	Specialization-Elective-II

Second Year

Third Semester

DSC xxxx	Thesis (Part-I) or Elective-II
DSC xxxx	Elective-III

Fourth Semester

DSC xxxx	Elective-IV
DSC xxxx	Thesis (Part-II) or Elective-V

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Course Types	Cumulative Credits
Core courses (3)	9
Specialization Requirement Courses (2)	6
Electives (3)	9
Thesis (Part-I & Part-II) or Independent Research Study (I & II) or Elective (II & V)	6
Total	30

Three Core Courses		Cr.Hrs
DSC 5101	Statistical and Mathematical Methods for Data Science	3
DSC 5102	Tools and Techniques in Data Science	2 + 1*
DSC 5201	Machine Learning	3

* 2+1 means 2 hours of lecture + 3 hours of lab work

Specialization Courses		Cr.Hrs
DSC 5243	Big Data Analytics	3
DSC 5223	Deep Learning	3
DSC 5241	Natural Language	3
DSC 5242	Distributed Data Processing	3

Deficiency Courses	
DSC xxxx	Programming Fundamentals (Core Programming Course)
DSC xxxx	Data Structures & Algorithms OR Design & Analysis of Algorithms
DSC xxxx	Database Systems

Elective Courses

DSC 5221 Advanced Computer Vision
 DSC 5125 Algorithmic Trading
 DSC 5224 Bayesian Data Analysis
 DSC 5242 Big Data Analytics
 DSC 5126 Bioinformatics
 DSC 5121 Cloud Computing
 DSC 5225 Computational Genomics
 DSC 5122 Data Visualization
 DSC 5223 Deep Learning
 DSC 5226 Deep Reinforcement Learning
 DSC 5127 Distributed Data Processing and Machine Learning
 DSC 5227 Distributed Machine Learning in Apache Spark
 DSC 5228 High-performance computing
 DSC 5128 Inference and Representation
 DSC 5241 Natural Language Processing
 DSC 5129 Optimization Methods for Data Science and Machine Learning
 DSC 5229 Probabilistic Graphical Models
 DSC 5231 Scientific Computing in Finance
 DSC 5131 Social network analysis
 DSC 5132 Time-series Analysis and Prediction

All courses may not be offered in every semester.

Elective courses may vary from time to time.

Alternative courses may be substituted as and when required.