



Master of Science in Data Science

Revised 11/07/2025

mdsprogram@umich.edu

Pre-Core (17-19 Credits)

Course #	Course Title	Cr	Notes
MATH/DATASCI 403	Introduction to Discrete Mathematics	3	First Fall semester
EECS 402	Programming for Scientists and Engineers	4	First Fall semester
EECS 403	Graduate Foundations of Data Structures and Algorithms	4	Enforced Prerequisites: MATH 403 and EECS 402
BIOSTATS 601 or MATH/STATS 425 or STATS 510	Probability and Distribution Theory	4	
	Introduction to Probability	3	
	Probability and Distribution	3	
BIOSTATS 602 or STATS 426 or STATS 511	Biostatistical Inference	4	Enforced Prerequisite: MATH/STATS 425 (or equivalent) Enforced Prerequisite: STATS 510
	Introduction to Theoretical Statistics	3	
	Statistical Inference	3	

Expertise in Data Management and Manipulation (7-8 Credits)

Course #	Course Title	Cr	Notes
EECS 484 <i>or</i> CSE 584	Database Management Systems	4	Enforced Prerequisite: EECS 403
	Advanced Database Systems	4	
EECS 485 <i>or</i> EECS 486 <i>or</i> CSE 549/SI 650 <i>or</i> SI 618 <i>or</i> DATASCI 507	Web Systems	4	EECS 485 available to MDS students in Spring term only
	Information Retrieval and Web Search	4	
	Information Retrieval	3	
	Data Manipulation and Analysis	3	
	Data Science and Analytics using Python	3	

Expertise in Data Science Techniques (6-8 Credits)

Course #	Course Title	Cr	Notes
BIOSTAT 650 or STATS 413 or STATS 500	Applied Statistics I: Linear Regression	4	Enforced Prerequisite: BIOSTAT 601 (or equivalent)
	Applied Regression Analysis	4	
	Statistical Learning I: Regression	3	
BIOSTAT 626 or EECS 545 or EECS 553 or EECS 476 or CSE 576 or SI 670 or SI 671 or DATASCI 415 or DATASCI 503	Machine Learning for Health Sciences	3	Enforced Prerequisite: BIOSTAT 601 (or equivalent)
	Machine Learning (CSE)	3	
	Machine Learning (ECE)	3	
	Data Mining	4	
	Advanced Data Mining	4	Enforced Prerequisite: EECS 403
	Applied Machine Learning	3	
	Data Mining: Methods and Applications	3	
	Data Mining and Statistical Learning	4	Enforced Prerequisite: STATS 413 (or equivalent)
	Statistical Machine Learning	4	

Capstone (3-4 Credits)

- Please refer to [MDS Capstone Guidelines](#) for details.

Course #	Course Title	Cr	Notes
BIOSTAT 610 or	Reading in Biostatistics	*	Enforced Prerequisites: STATS 500 and 503 (or equivalencies)
BIOSTAT 699 or	Analysis of Biostatistical Investigations	4	
CSE 599 or	Directed Study	*	
SI 691 or	Independent Study	*	
SI 699-xx5 or	Big Data Analytics	3	
STATS 504 or	Practice and Communication in Applied Statistics	3	
STATS 750	Directed Reading	*	

Electives (9 Credits minimum) - 1 course of 3 credits or more from each category.

- Electives must include at least 2 advanced graduate courses (500-level or above in LSA and CoE, or 600-level or above in UMSI and SPH).
- CSE/ECE 598 Special Topics will have specific sections approved on a semesterly basis according to their category.

Principles of Data Science

BIOSTAT 601 (Probability and Distribution Theory) | BIOSTAT 602 (Biostatistical Inference) | BIOSTAT 617 (Sample Design) | BIOSTAT 626 (Machine Learning Methods) | BIOSTAT 680 (Stochastic Processes) | BIOSTAT 682 (Applied Bayesian Analysis) | ECE 501 (Probability and Random Processes) | ECE 502 (Stochastic Processes) | EECS 545 (Machine Learning (CSE)) | ECE 551 (Matrix Methods for Signal Processing, Data Analysis, and Machine Learning) | EECS 553 (Machine Learning (ECE)) | ECE 559 (Optimization Methods for SIPML) | ECE 564 (Estimation, Filtering, and Detection) | SI 670 (Applied Machine Learning) | DATASCI 451 (Introduction to Bayesian Data Analysis) | DATASCI 470 (Introduction to Design of Experiments) | STATS 510 (Probability and Distribution Theory) | STATS 511 (Statistical Inference) | DATASCI 551 (Bayesian Modeling and Computation) | STATS 571 (Causal Inference)

Data Analysis

BIOSTAT 651 (Generalized Linear Models) | BIOSTAT 653 (Longitudinal Analysis) | BIOSTAT 666 (Statistical Models and Numerical Methods in Human Genetics) | BIOSTAT 675 (Survival Time Analysis) | BIOSTAT 685/STATS 560 (Non-Parametric Statistics) | BIOSTAT 695 (Categorical Data) | BIOSTAT 696 (Spatial Statistics) | ECE 556 (Image Processing) | STATS 414 (Topics in Applied Data Analysis) | STATS 501 (Applied Statistics II) | DATASCI 503 (Statistical Machine Learning) | STATS 509 (Statistics for Financial Data) | STATS 531 (Analysis of Time Series) | STATS 571 (Causal Inference) | STATS 600 (Regression Analysis) | STATS 601 (Advanced Statistical Learning) | STATS 605 (Advanced Topics in Modeling and Data Analysis) | STATS 700 (Topics in Applied Statistics I)

Computation

BIOSTAT 615 (Statistical Computing) | BIOSTAT 625 (Computing with Big Data) | EECS 481 (Software Engineering) | EECS 485 (Web Systems) | EECS 486 (Information Retrieval and Web Search) | EECS 504 (Foundations of Computer Vision) | EECS 542 (Advanced Topics in Computer Vision) | CSE 548/SI 649 (Information Visualization) | CSE 549/SI 650 (Information Retrieval) | CSE 572 (Randomness and Computation) | CSE 586 (Design and Analysis of Algorithms) | CSE 587 (Parallel Computing) | CSE 592 (Artificial Intelligence) | CSE 595/SI 561 (Natural Language Processing) | SI 564 (SQL and Databases 1.5 credits) + SI 644 (Advanced SQL and Databases 1.5 credits) | SI 608 (Networks) | SI 618 (Data Manipulation and Analysis) | SI 630 (Natural Language Processing: Algorithms and People) | SI 664 (Database Application Design) | SI 671 (Data Mining: Methods and Applications) | DATASCI 406 (Computational Methods in Statistics and Data Science) | STATS 506 (Computational Methods and Tools in Statistics) | DATASCI 507 (Data Science and Analytics using Python) | DATASCI 551 (Bayesian Modeling and Computation) | STATS 606 (Computation and Optimization Methods in Statistics)

Program Notes:

- Each course taken cannot satisfy more than 1 program requirement.
- At least 25 units of graduate-level coursework must be completed during residency in the Data Science program. Of these 25, 18 must be at the advanced graduate level (500-level or above in LSA and CoE; 600-level or above in UMSI and SPH).
- Rackham Graduate School requires a cumulative GPA of B (3.0) or better to be eligible to graduate.
- Program requirements on page 1 may be fulfilled by approved course waivers from having taken equivalent classes in prior education with grades B- or better. Waiver requests are considered for admitted students before the start of the program.