

ANALYTICS AND DATA SCIENCE MAJOR: ANALYTICS OPTION (B.S.)

<https://ceps.unh.edu/computer-science/program/bs/analytics-data-science-major-analytics-option>

Description

The option in Analytics is intended for students interested in either heading into industry immediately upon graduation, or pursuing graduate work in a professionally oriented program such as the Master of Science in Analytics at UNH. The option in Analytics places its emphasis on applications of data science in business and industry.

Program Objectives

Analytics and Data Science focuses on the extraction of meaning from data through the application of computer science, mathematics and business domain knowledge. Within a few years of obtaining a bachelor's degree in Analytics and Data Science, our alumni will have:

1. Engaged in successful career areas of analytics and data science and will already have, or be pursuing, advanced degrees in Analytics, Data Science, Computer Science, Mathematics or related fields
2. Applied the full range of core Data Science concepts and techniques to fill the analytics needs of an organization
3. Communicated effectively with diverse stakeholders as well as functioned appropriately in a team environment
4. Navigated the complex interconnections between data, computing technology, and the goals and constraints of the organization served
5. Understood the pervasive and changing role of data in global society, and participated responsibly as both an Analytics and Data Science professional and citizen

For additional information about the Analytics and Data Science: Analytics Option, contact [Matt Magnusson](mailto:Matt.Magnusson@unh.edu) (matthew.magnusson@unh.edu), program co-director (Durham campus), or [Jeremiah Johnson](mailto:Jeremiah.Johnson@unh.edu) (jeremiah.johnson@unh.edu), program co-director (Manchester campus), at (603) 641-4127.

Requirements

Degree Requirements

Minimum Credit Requirement: 128 credits

Minimum Residency Requirement: 32 credits must be taken at UNH

Minimum GPA: 2.0 required for conferral*

Core Curriculum Required: Discovery & Writing Program Requirements

Foreign Language Requirement: No

All Major, Option and Elective Requirements as indicated.

*Major GPA requirements as indicated.

Major Requirements

Successful completion of the degree program includes earning a minimum of 128 credits, meeting the requirements of the University's Discovery Program, completing 24 required courses in the major as listed below, including the capstone course, the internship preparedness course, and a three-credit internship.

In all major courses, a minimum grade of C- must be earned. The minimum overall GPA for graduation is 2.0.

Transfer students may transfer up to a maximum of 32 credits to satisfy major requirements (not counting those courses used to satisfy Discovery Program requirements).

Code	Title	Credits
Required Courses		
<i>Mathematics</i>		
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 644	Statistics for Engineers and Scientists	4
or COMP 570	Statistics in Computing and Engineering	
or MATH 539	Introduction to Statistical Analysis	
MATH 645	Linear Algebra for Applications	4
or MATH 545	Introduction to Linear Algebra	
MATH 739	Applied Regression Analysis	4
<i>Computer Science</i>		
CS 400	Introduction to Computing	2
CS 415	Introduction to Computer Science I	4
or CS 410P	Introduction to Scientific Programming/Python	
or COMP 424	Applied Computing 1: Foundations of Programming	
CS 416	Introduction to Computer Science II	4
or COMP 525	Data Structures Fundamentals	
CS 457	Introduction to Data Science and Analytics	4
or DATA 557	Introduction to Data Science and Analytics	
CS 515	Data Structures and Introduction to Algorithms	4
or COMP 625	Data Structures and Algorithms	
IT 505	Integrative Programming	4
or COMP 520	Database Design and Development	
IT 520	Foundations of Information Technology	4
or CS 520	Computer Organization and System-Level Programming	
or COMP 430	Systems Fundamentals	
<i>Business</i>		
Selected in consultation with advisor.		12
One (1) course in Introduction to Business		
One (1) course in Organizational Behavior		
One (1) course in Organizational Leadership		
<i>English</i>		
ENGL 502	Professional and Technical Writing	4
<i>Analytics</i>		
DATA 674 & DATA #675	Predictive and Prescriptive Analytics I and Predictive and Prescriptive Analytics II	8
or DATA 674 & CS 750	Predictive and Prescriptive Analytics I and Machine Learning	
or MATH 738 & CS 750	Data Mining and Predictive Analytics and Machine Learning	
DATA 690	Internship Experience	1-4
COMP 721	Big Data for Data Engineers ¹	4
<i>Capstone</i>		
CS 791 & CS 792	Senior Project I and Senior Project II	4
or CS 799	Thesis	
<i>Electives</i>		
Select three (3) 600 or 700-level elective courses approved by advisor.		12
Total Credits		91-94

¹ Or another suitable 700-level data science or data engineering course chosen in consultation with the program coordinator.

Degree Plan

Sample Degree Plan

First Year

Fall		Credits
CS 400	Introduction to Computing	2
CS 415	Introduction to Computer Science I	4
CS 457	Introduction to Data Science and Analytics	4
MATH 425	Calculus I	4
ENGL 401	First-Year Writing	4
Credits		18

Spring

CS 416	Introduction to Computer Science II	4
MATH 426	Calculus II	4
ADMN 400	Introduction to Business	4
Discovery Course		4
Credits		16

Second Year

Fall		Credits
CS 515	Data Structures and Introduction to Algorithms	4
IT 520 or CS 520	Foundations of Information Technology or Computer Organization and System-Level Programming	4
MATH 645 or MATH 545	Linear Algebra for Applications or Introduction to Linear Algebra	4
Discovery Lab		4
Credits		16

Spring

MATH 539 or MATH 644	Introduction to Statistical Analysis or Statistics for Engineers and Scientists	4
ENGL 502	Professional and Technical Writing	4
MGT 535	Organizational Behavior	4
Discovery Lab		4
Credits		16

Third Year

Fall		Credits
DATA 674	Predictive and Prescriptive Analytics I	4
IT 505	Integrative Programming	4
MGT 540	Leadership in the 21st Century	4
Discovery Course		4
Credits		16

Spring

DATA 690	Internship Experience	1-4
Analytics Course II		4
600- or 700-level Elective I		4
Discovery Course		4
Credits		13-16

Fourth Year

Fall

CS 791	Senior Project I	2
MATH 739	Applied Regression Analysis	4
CS 750	Machine Learning	4
600- or 700-level Elective II		4
Discovery Course		4
Credits		18

Spring

CS 792	Senior Project II	2
CS 775	Database Systems	4
600- or 700-level Elective III		4
Discovery Course		4
Credits		14
Total Credits		127-130

Student Learning Outcomes

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply theory, techniques, and tools throughout the data analysis lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.