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 (matthew.magnusson@unh.edu), program co-director (Durham campus), Jeremiah Johnson (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 | Required Courses | Title |
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**Mathematics** |
MATH 425 | Calculus I | 4 |
MATH 426 | Calculus II | 4 |
MATH 644 | Statistics for Engineers and Scientists | 4 |
or COMP 570  
or MATH 539 | Statistics in Computing and Engineering  
Introduction to Statistical Analysis | |
MATH 645 | Linear Algebra for Applications | 4 |
or MATH 545  |  
Introduction to Linear Algebra | |
MATH 739 | Applied Regression Analysis | 4 |
**Computer Science** |
CS 400 | Introduction to Computing | 2 |
CS 416 | Introduction to Computer Science I | 4 |
or CS 410P  
or COMP 424 |  
Introduction to Scientific Programming/Python  
Applied Computing I: 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  
or COMP 430 |  
Computer Organization and System-Level Programming  
Systems Fundamentals | |
**Business** |
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

**English** |
ENGL 502 | Professional and Technical Writing | 4 |
**Analytics** |
DATA 674 | Predictive and Prescriptive Analytics I and II | 8 |
or DATA 675  
or MATH 738  
& CS 790  
& CS 790 |  
Predictive and Prescriptive Analytics I  
Data Mining and Predictive Analytics  
and Machine Learning  
and Machine Learning | |
DATA 690 | Internship Experience | 1-4 |
COMP 721 | Big Data for Data Engineers 1 | 4 |
**Capstone** |
CS 791  
or CS 792  |  
Senior Project I  
and Senior Project II | 4 |
or CS 799 | Thesis |  |
**Electives** |
Select three (3) 600 or 700-level elective courses approved by advisor: 12

**Total Credits** 91-94
Degree Plan

### Sample Degree Plan

#### First Year

**Fall**
- 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**
- 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**
- DATA 674 Predictive and Prescriptive Analytics I 4
- IT 505 Integrative Programming 4
- MGT 540 Leading with Impact: Strategies for Modern Leadership 4
- Discovery Course 4

**Credits** 16

**Spring**
- DATA 690 Internship Experience 1-4
- Analytics Course II 4
- 600- or 700-level Elective I 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.