

DATA ANALYTICS MAJOR

Dr. James Cercone, Chair Data and Computer Science

Mission Statement

The mission of the data analytics program is to provide students with the knowledge and skills needed to collect, integrate and analyze complex quantitative and qualitative data.

Demand for individuals with expertise in the field of data analytics is projected to increase significantly over the next decade. A recent study predicts that employment opportunities in the realm of data science will increase by approximately 30% by 2020, especially in the fields of business administration, marketing, finance, insurance, professional services and information technology. Similarly, rapid growth in the areas of telemedical services and health informatics is creating an urgent need for practitioners who possess the knowledge and skills needed to organize, interpret and disseminate the increasing volume and complexity of health data. Beyond this, employment opportunities are beginning to increase in fields such as law enforcement, cybersecurity, urban planning and education as decision makers exploit data mining and predictive analytics to develop proactive solutions for a wide variety of policy issues.

Program Description

The data analytics major provides students with the knowledge and skills needed to collect, integrate and analyze complex quantitative and qualitative data. Drawing upon the disciplines of statistics, mathematics and computer science, students will learn how computer programming, database management, data analysis, and data visualization tools can be utilized to collate, interpret and present complex data applicable to a wide variety of fields. Students have the opportunity to choose a minor focus area that provides domain expertise.

There are four major components that comprise the Data Analytics Major:

Mathematics

Focused Topics in Data Analytics

Computer Science

A concentrated application area – Domain Knowledge

Mathematics is the heart of analytics. The analysis of data requires the conditioning , metrics creation, feature extraction, statistics, data compression, and the underlying mathematics that drive the generation of decision points (the nuts and bolts of non-linear neural networks, fuzzy logic, Bayesian logic, etc.).

Focused Topics utilize the conditioned data in order to classify, visualize, train learning networks, and simulate new scenarios. The end goal is using the collected data to make informed decisions.

Data in a void has little value. Topics in **Computer Science** enable the student of analytics to collect data from external sensors, databases, data mined from the web, and a host of other sources. This data needs to be conditioned (with the mathematics) stored, transmitted, received, archived, and made secure using the tools of computer science. The current state of the art contains a wide array of different software systems and protocols. Generation of “middle ware” to interconnect these disjoint systems becomes a major part of a data analyst workload.

Given the wide range of areas that a data analyst might encounter, it seems prudent that each student gain at least an introductory level knowledge in an additional field of study. This **“Domain Knowledge”** will typically be comprised of a minor from one of the existing programs at UC. No restrictions will be placed on the selection of a minor. As an alternate approach, students with unusual goals or existing background credits and/or experience will be able to develop a set of focused domain specific electives in conjunction with their advisor.

Program Outcomes

The graduate will:

1. Apply data science principles relating to data retrieval, processing, and analysis.
2. Apply mathematical and statistical concepts to detect patterns in data and to draw inferences.
3. Apply critical thinking skills for approaching problems and making assessment decision.
4. Evaluate research results and communicate findings in data science.

Admission Requirements

Students must gain general admission to the University of Charleston. A visit to campus to meet with Admissions personnel and program faculty is strongly encouraged.

Additional Requirements

- Students must have a 21 ACT or 540 SAT math score, or they must have completed MATH 120 before they are able to enroll in MATH 121.
- In order to graduate, a student must receive a minimum grade of “C” for each of the program courses.
- Data analytics majors must meet all University of Charleston graduation requirements and successfully complete the Data Science Senior Capstone course.

What You Will Study

The Data Analytics degree program requires a minimum of 121 credits, including 45 credits of academic work, 8 credits of Computer Science, 13 credits of mathematics and statistics, and a 3-credit hour internship.

Standard Four-Year Path

FRESHMAN YEAR			
FALL SEMESTER		SPRING SEMESTER	
COMM 101 Freshman Writing I	3	COMM 102 Freshman Writing II	3
Flex Elective *	3	MATH 201 Calculus I (Flex Elective)	4
COSC 110 Computer Science I (STEM Flex)	3	COSC 120 Computer Science II	3
COSC 110L Computer Science I Lab	1	COSC 120L Computer Science II Lab	1
DASC 100 Intro. Sci. Prog. (STEM Flex)	3	SPCH 103 Speech (embedded)	3
UNIV 104 College Motivation & Success	3	UNIV 105 Foundations of Character & Leadership	3
TOTAL CREDITS	16	TOTAL CREDITS	17

** Math 123 (if needed)*

SOPHOMORE YEAR			
FALL SEMESTER		SPRING SEMESTER	
MATH 225 Discrete Math (Flex Elective)	4	MATH 230 Linear Algebra	3
COSC 280 Data Structures	3	DE 1 Domain Emphasis *	3
DASC 101 Intro to Data Science	3	COSC 315 Database Systems	3
STAT 101 Stat. for Data Science	3	MATH 240 Prob and Stat	3
Humanities Flex Course	3	Soc. Sci. Flex Course	3
TOTAL CREDITS	16	TOTAL CREDITS	15

JUNIOR YEAR			
FALL SEMESTER		SPRING SEMESTER	
DASC 200 Intro. to Data Mining	3	DASC 250 Data Visualization	3
COSC 360 Web App Development		DASC 310 Machine Learning	

	3		3
Elective	3	DASC 330 Mod. and Simulation	3
COSC 345 Computer Networks	3	DE 3 Domain Emphasis *	3
DE 2 Domain Emphasis *	3	Soc. Sci. Flex Course	3
TOTAL CREDITS	15	TOTAL CREDITS	15

SENIOR YEAR			
FALL SEMESTER		SPRING SEMESTER	
DASC 375 Natural Lang. Processing	3	DASC 475 Capstone	3
DASC 450 Data Science Internship	3	COSC 420 Adv CS Math	3
Humanities Flex Course	3	Elective	3
DE 4 Domain Emphasis *	3	DE 6 Domain Emphasis*	3
DE 5 Domain Emphasis *	3		
TOTAL CREDITS	15	TOTAL CREDITS	12

* Domain Emphasis courses are typically comprised of an existing UC minor. Other electives require an approved departmental plan.

121 Credit Hours Total