

DATA ANALYTICS, MASTER OF SCIENCE (MS)

The Masters of Science in Data Analytics (MSDA) is responsive to current societal trends. Recent advances in technology, such as smart phones, e-commerce, social networking and electronic health records, have generated vast sources of data. Moreover, the rate at which data are being generated is growing at a phenomenal pace. A recent Bureau of Labor Statistics article reported that 90% of the data that exists today was created within the past two years. This data explosion has created a high demand for professionals who are capable of making effective and efficient use of "big data". The expression "big data" refers to datasets whose size is too large to be stored, managed, or analyzed using conventional database management and statistical analysis software tools. Big data is changing the way a vast array of sectors perform their functions. Managers that effectively use big data gain a significant competitive edge by improving decision making and performance.

They can also react more quickly to changing market demands. In hospital settings, advanced data analytics will be used to monitor and analyze end-to-end care delivery with real-time monitoring of quality and performance. A focus on big data is a distinguishing feature of the MSDA.

Data scientists are in great national demand right now, but they are called many different things. The BLS classifies data scientists as "statisticians, computer programmers, or in other occupations". Regionally, the state data projects that market research analysts, computer systems analysts and management analysts will add 7,100 jobs in the 150-mile region around Slippery Rock University between 2010 and 2020. These occupations are also designated as high-priority by the PA Department of Labor & Industry.

An important characteristic that sets Slippery Rock University's MSDA apart from other data science or business intelligence programs is its alignment with national standards and certification programs. In particular, the courses are designed to

- provide a joint certificate in statistical applications and data analytics from SRU and the SAS Institute, Inc. (https://www.sas.com/en_us/home.html), one of only fifty-six institutions in the country to do so, and
- effectively prepare students to pass the Certified Analytics Professional (CAP) Exam.
 - All candidates competing this program are eligible to sit for the Certified Analytics Professional (CAP) examination after 3 years of field experience. While certification is not required for employment, certification can advance your career.

SAS Institute, Inc. (https://www.sas.com/en_us/home.html) is one of the most widely used software platforms in the world for performing data analytics and statistical analysis. A recent poll of online job postings showed 1800 jobs requesting SAS Institute, Inc. (https://www.sas.com/en_us/home.html) expertise within a 150 mile radius of SRU. The CAP exam is a broad-based analytics exam administered by the Institute for Operations Research and the Management Science (INFORMS). INFORMS is the largest professional organization in the world that supports operation research, management science, and data analytics. By aligning the MSDA with these professional organizations, SRU students will be positioned to take advantage of state-of-the-art technologies and best practices in data analytics.

The Masters of Science in Data Analytics will require 33 credits of graduate work that integrates the fields of statistics, operations research, and data science. Although relevant topics from these fields serve as a common thread throughout the program, each course has a primary area of emphasis. These areas of emphasis include 12 credits of statistics, 12 credits of data science, and 6 credits of operations research. A 3 credit capstone/internship course is used to affirm the appropriate integration of skills. Courses will be delivered using a 100% online format.

The MSDA program has the goal of cultivating the analytical skills of graduates who will be well-prepared to work in the growing field of big data analytics. For those already working in the fields of business, public health and health care, information systems, and management, their competency will be enhanced with consequent benefits for the communities they serve. The program is designed to meet the needs of working professionals. Students embarking on a career in data analytics will be prepared for the ever-increasing demands of the profession, and will be able to help fill the gap between the supply of, and demand for, big data analytics. It follows that the MSDA will primarily be practitioner-oriented rather than research-oriented.

Program Learning Outcomes

Upon graduation, MSDA students should be able to :

- Apply quantitative modeling techniques, such as probability, statistics, optimization, and simulation, to the solution of business and health care problems.
- Use innovative methods and technologies to successfully extract, scrub, integrate, format, visualize, and analyze big data.
- Know how to query and analyze complex databases to provide real world, real-time solutions.
- Use predictive analytics and forecasting to improve decision making in business and health care.
- Effectively communicate analysis results to assist in strategic decision making.
- Analyze and optimize the delivery, quality, and costs of health care from a data-driven perspective.
- Analyze market data to provide a competitive edge for business and more agile management practices.

Related Links

Data Analytics, MS Program Page (<https://www.sru.edu/academics/graduate-programs/data-analytics-master-of-science/>)

Mathematics and Statistics Department Page (<https://www.sru.edu/academics/colleges-and-departments/ches/departments/mathematics-and-statistics/>)

Data Analytics Fact Sheet (<https://www.sru.edu/documents/programs/factsheets/graduate/fs-data.pdf>)

Professional Licensure/Certification Page (<https://www.sru.edu/students/student-consumer-information/professional-licensures/>)

Curriculum Guide

Code	Title	Hours
STAT 603	Statistical Methods	3
CPSC 605	Data Mining and Data Analysis	3
STAT 630	Regression Methods	3
MATH 611	Optimization Models	3

STAT 656	Statistical Computing	3
MATH 678	Data Analytics Capstone I	3
CPSC 685	Big Data Analytics	3
MATH 668	Model Analysis	3
STAT 672	Forecasting and Time Series	3
STAT 660	Advanced Statistical Methods	3
MATH 688	Data Analytics Capstone II	3
Total Hours		33

Important Curriculum Guide Notes

This Curriculum Guide is provided to help SRU students and prospective students better understand their intended major curriculum. Enrolled SRU students should note that the My Rock Audit may place already-earned and/or in progress courses in different, yet valid, curriculum categories. Enrolled SRU students should use the My Rock Audit Report and materials and information provided by their faculty advisers to ensure accurate progress towards degree completion. *The information on this guide is current as of the date listed. Students are responsible for curriculum requirements at the time of enrollment at the University.*

PASSHE - Pennsylvania State System of Higher Education Institutions

Major Code: 9MDA

Recommended Course Sequence

Full-Time Course Sequence

Course	Title	Hours
First Year		
Fall		
STAT 603	Statistical Methods	3
STAT 630	Regression Methods	3
CPSC 605	Data Mining and Data Analysis	3
MATH 611	Optimization Models	3
Hours		12
Winter		
STAT 656	Statistical Computing	3
MATH 678	Data Analytics Capstone I	3
Hours		6
Spring		
STAT 660	Advanced Statistical Methods	3
STAT 672	Forecasting and Time Series	3
CPSC 685	Big Data Analytics	3
MATH 668	Model Analysis	3
Hours		12
Summer		
MATH 688	Data Analytics Capstone II	3
Hours		3
Total Hours**		33

** This document is meant to serve as a guide. Please consult with your academic adviser and refer to your curriculum guide prior to registering for courses. This plan should be reviewed, and verified, by you and your academic adviser at least once each academic year.

Part-Time Course Sequence

Course	Title	Hours
First Year		
Fall		
STAT 603	Statistical Methods	3
STAT 630	Regression Methods	3
Hours		6
Winter		
STAT 656	Statistical Computing	3
Hours		3
Spring		
STAT 660	Advanced Statistical Methods	3
STAT 672	Forecasting and Time Series	3
Hours		6
Second Year		
Fall		
CPSC 605	Data Mining and Data Analysis	3
MATH 611	Optimization Models	3
Hours		6
Winter		
MATH 678	Data Analytics Capstone I	3
Hours		3
Spring		
CPSC 685	Big Data Analytics	3
MATH 668	Model Analysis	3
Hours		6
Summer		
MATH 688	Data Analytics Capstone II	3
Hours		3
Total Hours**		33

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