NATIONAL UNIVERSITY

COLLEGE OF PROFESSIONAL STUDIES

MASTER OF SCIENCE IN DATA SCIENCE

Statistics and Analytics for the Real World

Solving real-world problems through statistical methods is the core of the Master of Science in Data Analytics program at National University. Coursework will ground you in how to apply statistical techniques and tools, and how to use methods such as in-depth analysis, synthesis, and evaluation for careers that could include the advanced application of data analytics in unique fields. The curriculum has been designed to include core courses in statistical topics; state-of-the-art analytical software will be used in all courses.

The program covers:

- Preparing you for careers using analytical database knowledge
- Skills and techniques in applying analytical database tools, techniques, and methods
- Analytical and predictive modeling, data acquisition, data mining, data security, and privacy
- How to design, develop, implement, program, and maintain data marts and data warehouses

Program highlights:

- Entire program can be completed online
- Construct data files using advanced statistical and data programming techniques to solve practical problems
- Design an analytic strategy to frame a potential issue and solution relevant to the community and stakeholders
- Develop team skills to ethically research, develop, and evaluate analytic solutions to improve organizational performance
- Evaluate machine learning methods and strategies for advanced data mining

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MASTER OF SCIENCE IN DATA SCIENCE

Academic Program Director: Jodi Reeves; (858) 309-3426; jreeves@nu.edu

Apply statistical methods to solve real-world problems and prepare for careers in data science. Core courses include data modeling, data management, and data mining of continuous, categorical, and multivariable data. Advanced specializations focus on database analytics, business analytics, or health analytics. The program culmination is a three-month capstone where real data from sponsoring organizations or publicly available data will be used in a data science project to demonstrate mastery in data acquisition, cleaning, analysis, modeling, and visualization.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Integrate components of data science to produce knowledge-based solutions for real-world challenges using public and private data sources.
- Evaluate data management methods and technologies used to improve integrated use of data.
- Construct data files using advanced statistical and data programming techniques to solve practical problems in data analytics.
- Design an analytic strategy to frame a potential issue and solution relevant to the community and stakeholders.
- Develop team skills to ethically research, develop, and evaluate analytic solutions to improve organizational performance.

Degree Requirements

To obtain the Master of Science in Data Science, students must complete at least 63 graduate units. A total of 13.5 quarter units of graduate credit may be granted for equivalent graduate work completed at another regionally accredited institution, as it applies to this degree, and provided the units were not used in earning another advanced degree. Please refer to the graduate admissions requirements for specific information regarding application and evaluation.

Program Requirements

(14 courses; 63 quarter units)

Core Requirements

(7 courses; 31.5 quarter units)

ANA 600	Fundamentals of Analytics
ANA 605	Analytic Models & Data Systems *Prerequisite: BAN 600*
ANA 610	Data Management for Analytics
ANA 615	Data Mining Techniques
ANA 620	Continuous Data Methods, Appl *Prerequisite: ANA 615*
ANA 625	Categorical Data Methods, Appl *Prerequisite: ANA 620*
ANA 630	Advanced Analytic Applications *Prerequisite: ANA 625*

Students must select one of the area of specializations.

Capstone Requirements

(3 courses; 13.5 quarter units)

Students must complete all core and area of specialization courses prior to starting the capstone course sequence.

ANA 699A	Analytic Capstone Project I *Prerequisite: All core and specialization courses in an analytics program with a minimum GPA of 3.0 or approval of Lead Faculty.*
ANA 699B	Analytic Capstone Project II *Prerequisite: ANA 699A*
ANA 699C	Analytics Capstone Project III *Prerequisite: ANA 699B*

Specialization in Business Analytics

Academic Program Director: Farnaz Sharifrazi; (858) 642-8468; fsharifrazi@nu.edu

The specialization in Business Analytics is designed to prepare students to apply scientific knowledge to big data to find practical patterns for decision making. Organizations measure their operations, forecasting, and future strategic plans scientifically through analyzing data in marketing, sales, finances, and supply chain areas.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Evaluate data models to analyze the performance of supply chain processes.
- Analyze data to predict business outcomes in marketing processes.
- Design an probabilistic finance model to forecast business outcomes.
- Apply security, privacy, and ethical measures using data and analytical models to business processes.

Requirements for the Specialization

(4 courses; 18 quarter units)

BAN 640	Performance MGT & SCM Process
BAN 645	Prediction in Marketing
BAN 650	Probabilistic Finance Models
BAN 655	Analytical Security & Ethics

Specialization in Database Analytics

Academic Program Director: Jodi Reeves; (858) 309-3426 jreeves@nu.edu

Specialization topics include how to develop, implement, and maintain the hardware and software tools needed to make efficient and effective use of big data, including databases, data marts, data warehouses, machine learning, and analytic programming.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Design data marts.
- Analyze complex database queries for real-world analytical applications.
- Design medium-to-large data warehouses.
- Evaluate machine learning methods and strategies for advanced data mining.

Requirements for Specialization

(4 courses; 18 quarter units)

ANA 650	Database Design for Analytics
ANA 655	Data Warehouse Design & Devel *Prerequisite: ANA 650*
ANA 660	Advanced SQL Programming *Prerequisite: ANA 655*
ANA 665	Data Mining & Machine Learning *Prerequisite: ANA 660*

Specialization in Health Analytics

Academic Program Director: Tyler Smith; (858) 309-3487; tsmith@nu.edu

The Specialization in Health & Life Science Analytics is designed to provide students with a practical learning experience through application of statistical methods to solve real-life health and life science analytics problems. The goal of this specialization is to prepare students for careers in health analytics and the pharmaceutical industry. To address the spectrum of issues in health and life science analytics, this curriculum has been designed to include specialized courses in analytic topics relative to the health and clinical fields. Topics include analytical and predictive modeling, data acquisition, data mining, health care information management systems, epidemiology, health management, clinical research, clinical trials, health outcomes research, teamwork, and communication. Additionally, team projects are conducted using real data from sponsoring organizations or publicly available data. Previous academic or industrial experience in such areas as statistics, computer programming, engineering, epidemiology, health care, clinical trials, or science are helpful prerequisites for this MS program. This degree is appropriate for both experienced professionals as well as recent college graduates.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Analyze the planning, organization, administration, and policies of health care organizations using health analytic methods.
- Evaluate health care information system technologies through integration and interoperability of health data.
- Integrate data and analytic techniques to establish financial priorities of a health care organization in line with the needs and values of the community and stakeholders it serves.
- Analyze the distribution and determinants of disease and health outcomes in human populations.

Requirements for the Specialization

(4 courses; 18 quarter units)

HCA 626	Healthcare Information Systems *Prerequisite: ANA 630*
COH 606	Epidemiology *Prerequisite: COH 602, or ANA 630*
ANH 604	Clinical Research Analytics
ANH 607	Health Outcomes Research