Proposed Course of Study for B.S. in Data Science

By its very nature data science requires a strong foundation in computing, probability, statistics, data analysis, and data management.

Overview Courses (2 @ 1 SH)
- CS 1200 CS/IS/DS Overview 1
- CS 1210 CS/IS/DS Overview 2: Co-op Preparation

Computer Science Foundations (5 @ 4 SH, 3 @ 1 SH, 1 @ 0 SH)
- CS 1800 Discrete Structures *plus* CS 1801 Recitation for CS 1800
- CS 2500 Fundamentals of Computer Science 1 *plus* CS 2501 Lab for CS 2500
- CS 2510 Fundamentals of Computer Science 2 *plus* CS 2511 Lab for CS 2510
- CS 3500 Object-Oriented Design
- CS 3520 Programming in C++
- CS 4000 Senior Seminar

Information Science Foundations (2 @ 4 SH)
- IS 2000 Principles of Information Science
- CS 3200 Database Design

Mathematics and Statistics Foundations (3 @ 4 SH)
- MATH 1341 Calculus 1 for Science and Engineering
- MATH 1342 Calculus 2 for Science and Engineering

Choose one statistics course below:
- ECON 2350 Statistics
- ENVR 2500 Biostatistics
- MATH 3081 Probability and Statistics
- PSYC 2320 Statistics in Psychological Research

*Note:* PSYC 2320 has PSYC 1101 as a prerequisite.

Data Science Foundations (6 @ 4 SH)
- DS 4100 Data Collection, Integration, & Analysis
- DS 4200 Information Presentation & Visualization
- DS 4300 Large-Scale Data & Information Storage
- DS 4400 Machine Learning & Data Mining 1
- **DS 4420** Machine Learning & Data Mining 2
- **DS 4900** Data Science Senior Project

**Data Science Related Electives (6 @ 4 SH)**

Complete a combined six (6) courses from Categories A and B of which at least three (3) courses must be from Category B:

**Category A: Data Science Related Electives in Computer and Information Science**
- **IS 3500** Information System Design and Development
- **IS 4200** or **CS 6200** Information Retrieval
- **IS 4300** Human Computer Interaction
- **IS 4700** or **CS 5750** Social Information Systems
- **IS 4800** or **CS 6350** Empirical Research Methods
- **CS 3740** Introduction to Security
- **CS 4100** or **CS 5100** Artificial Intelligence
- **CS 4120** or **CS 6120** Natural Language Processing
- **CS 4240** or **CS 6240** Parallel Data Processing in MapReduce
- **CS 4500** or **CS 5500** Software Development
- **CS 4550** or **CS 5610** Web Development
- **CS 4650** or **CS 5650** High Performance Computing
- **CS 4800** or **CS 5800** Algorithms & Data
- **CS 6110** Knowledge-Based Systems
- **CS 6140** Machine Learning
- **CS 6220** Data Mining Techniques

**Category B: Data Science Related Electives in Other Units**
- **ARTG 3451** Information Design 1
- **ARTG 4552** Information Design 2
- **ARTG 5100** Information Design Studio 1—Principles
- **ARTG 5110** Information Design History
- **ARTG 5120** Information Design Research Methods
- **ARTG 5330** Visualization Technologies
- **ARTG 6100** Information Design Studio 2—Dynamic Mapping and Models
- **ARTG 6200** Information Design Studio 3—Synthesis
- **BIOL 5603** Computational Neuroscience
- **BIOL 6308** Bioinformatics Computational Methods 1
- **BIOL 6309** Bioinformatics Computational Methods 2
- **DSSH 6302** Information Design and Visual Analytics
- **EECE 4542** Advanced Engineering Algorithms
- **EECE 5639** Computer Vision
- **EECE 5642** Data Visualization
- **EECE 5644** Introduction to Machine Learning and Pattern Recognition
- EECE xxxx Big Data Analytics [new course]
- **FINA 4608** Advanced Financial Strategy
- **GSND 5110** Game Design and Analysis
- **GSND 6350** Game Analytics
- **HINF 5101** Introduction to Health Informatics and Health Information Systems
- **HINF 5102** Data Management in Healthcare
- **HINF 5300** Personal Health Interface Design and Development
- **HINF 5301** Personal Health Technologies: Field Deployment and System Evaluation
- **IA 5010** Foundations of Information Assurance
- **IA 5050** Data Mining in Cyberspace
- **IA 5200** Security Risk Management and Assessment
- **IE 4615** Expert Systems and Neural Networks
- **IE 5640** Data Mining for Engineering Applications
- **ECON 2350** Statistics
- **ECON 2360** Applied Econometrics
- **ENVR 2500** Biostatistics
- **MATH 2331** Linear Algebra
- **MATH 3081** Probability and Statistics
- **MATH 4581** Statistics and Stochastic Processes
- **MISM 3305** Information Resource Management
- **MISM 3403** Data Management in the Enterprise
- MKTG 3401 Marketing Research
- MKTG 3501 Marketing Analytics
- PSYC 2320 Statistics in Psychological Research

Note: The statistics courses are also listed here as Data Science Related Electives. A student is permitted to take at most one additional statistics course to see statistics from the perspective of a different department.

**Total Data Science Requirements (22 @ 4 SH, 5 @ 1 SH, 1 @ 0 SH)**

**English Requirement (2 @ 4 SH)**

- ENGW 1111 College Writing

Choose one writing course below.

- ENGW 3302 Advanced Writing in the Technical Professions
- ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines

**General Electives and Remaining NU Core Requirements (8 @ 4 SH)**

Note: Students will meet the following NU Core 2016 categories by meeting requirements in this degree program:

ND, FQ, AD, CE.

The four writing requirements are also met.

The experiential education requirement, EX, is normally met by cooperative education.

Students must use general electives to meet the following NU Core 2016 categories:

EI, IC, SI, DD, ER.

**Grand Total (32 @ 4 SH, 5 @ 1 SH, 1 @ 0 SH)**