Doctoral Degree
Ph.D. in Data Science (D500)
Program Guide (eff. 2024)

Program Information

The Ph.D. in Data Science program will provide the essential skills required to analyze big and complex data sets and equip students with a broad understanding of data challenges and opportunities, along with the research and inquiry skills necessary to independently conduct research and answer questions within their area of concentration.

To meet this goal, courses in the Ph.D. in Data Science Program curriculum are organized around interdisciplinary focal areas in computer science, engineering, mathematics, and statistics. Courses offered within this framework include traditional lecture-style, e-learning, and special topics courses that introduce students to the latest theories, methods, and emerging issues; seminar series; and experiential learning through thesis research, (directed independent study and internship programs). Through this framework, students will gain proficiency in the application of scientific principles such as, critical thinking, experimental design, data preprocessing and wrangling, data visualization, advanced statistical learning/data mining and machine learning, as well as a sense of professional and technical writing, and reporting, responsibility, and integrity.

Rowan University assesses the effectiveness of doctoral programs to ensure that participating students have the maximum opportunity to develop the foundational knowledge, skills, and confidence to become creative independent researchers in their selected career path.

Degree Completion Requirements

Students possessing a bachelor's degree will be required to complete a minimum of 72 semester hours of graduate-level work. Students possessing a master's degree in a related field will be required to complete a minimum of 42 semester hours of graduate-level work beyond their master's degree in addition to meeting other Ph.D. requirements in section below. Up to 30 of the credits earned in pursuit of your master's degree may be transferable to the Ph.D. program as either core courses or elective courses.

The curriculum requirements for the Ph.D. in Data Science are distributed as follows:

- Core Courses 15 s.h.
- General Coursework 6 s.h.
- Elective Courses 21 s.h. - 30 s.h.
- Thesis Research 21 s.h. - 30 s.h.

Core Courses (required) – 15 s.h.

Course #	Course Name	Notes	Sem/Yr	Grade	Credits
Data Mining and Visualization					
CS 02516	Big Data Tools and Techniques				3
Probability and Statistics					
MATH 01505	Probability and Mathematical Statistics I				3
STAT 02515	Applied Multivariate Data Analysis				3
Machine Learning (take one of the following)					
CS 07556	Machine Learning I				3
ECE 09555	Advanced Topics in Pattern Recognition				3
Decision Optimization (take one of the following)					
MATH 03511	Operations Research I				3
ENGR 01511	Engineering Optimization				3
				Subtotal: 15 s.h.	

General Coursework (required) – 6 s.h.

Course #	Course Name	Notes	Sem/Yr	Grade	Credits
XEED 01601	Effective Teaching in Academic, Corporate and Gov't Settings				3
ECE 09702	Strategic Technical Writing and Winning Grant Proposals				3
				Subtotal: 6 s.h.	

Elective Courses – 21 s.h.-30 s.h.

A minimum of 21 and a maximum of 30 semester hours of elective coursework are required. Courses will be recommended by a student's thesis advisor to align with their research area. Elective courses and thesis research must total 51 semester hours. The distribution between these two areas will be determined by the student and their thesis advisor. Elective courses are 3 credits each. Students must complete between 7 and 10 of the following courses:

Course #	Course Name	Notes	Sem/Yr	Grade	Credits
CS 02505	Data Mining I				3
CS 02530	Advanced Database Systems: Theory and Programming				3
CS 02605	Data Mining II				3
CS 02620	Data Warehousing				3
CS 02625	Data Quality and Web/Text Mining				3
CS 02630	Advanced Topics in Database Systems				3
CS 07540	Advanced Design and Analysis of Algorithms				3
CS 07559	Advanced Models of Deep Learning				3
CS 07656	Machine Learning II				3
DS 02510	Visual Analytics				3
DS 02695	Advanced Topics in Data Science				3
ECE 09558	Reinforcement Learning				3
ECE 09560	Artificial Neural Networks				3
ECE 09566	Advanced Topics in Systems, Devices, and Algorithms in Bioinformatics				3
ECE 09568	Discrete Event Systems				3
ECE 09585	Advanced Engineering Cyber Security				3
ECE 09586	Advanced Portable Platform Development				3
ECE 09595	Advanced Emerging Topics in Computational Intelligence, Machine Learning and Data Mining				3
ECE 09655	Advanced Computational Intelligence and Machine Learning				3
MATH 01506	Probability and Mathematical Statistics II				3
STAT 02509	Probability and Statistics for Data Science				3
STAT 02510	Introduction to Statistical Data Analysis				3
STAT 02511	Statistical Computing				3
STAT 02514	Decision Analysis				3
STAT 02525	Design and Analysis of Experiments				3
STAT 02530	Applied Survival Analysis				3
STAT 02585	Introduction to Bayesian Statistical Methods				3
				Subtotal: 21-30 s.h.	

Thesis Research – 21 s.h.- 30 s.h.

A minimum of 21 and a maximum of 30 semester hours of thesis research are required. Thesis research and elective courses must total 51 semester hours. The distribution between these two areas will be determined by the student and their thesis advisor.

Course #	Course Name	Notes	Sem/Yr	Grade	Credits
DS 02799	Doctoral Research and Dissertation				21-30
				Subtotal: 21-30 s.h.	

Degree completion requirements for students possessing a master's degree in a related field

These students must complete a ***minimum*** of 42 s.h. beyond their master's degree

- Core Courses 15 s.h.
- General Coursework 6 s.h.
- Elective Courses 21-30 s.h.
- Thesis Research 21-30 s.h.

Additionally, these students must complete all core courses that have not transferred. If 30 s.h. hours are not transferred into the Ph.D. program, students will be required to take additional courses such that the total of transferred credits and credits earned at Rowan University total 72 s.h.

Minimum Required Grades and Cumulative GPA

The Ph.D. in Data Science is a Category 3 program.

For details regarding Graduate Policies and Procedures, please visit:

https://sites.rowan.edu/student-success/graduate-student-information/graduate-policies.html