DATA SCIENCE / DOCTOR OF ENGINEERING

The D.Eng. in Data Science program allows students to pursue advanced coursework in Data Science and provides an opportunity to gain experience through a long-term applied project. Students in this program will develop and implement a large breadth of knowledge in Data Science and specialized expertise in a particular sub-area of the field that they will research. This program can be completed both on-ground and online. Graduates of this program can qualify for advanced Data Science positions in industry, government, and academia. The program allows students to pursue a particular application area of Data Science and take courses from a variety of subjects, including outside of the data science field.

Time Limitation for Completing the Program

A student must complete all graduation requirements within seven years from completion of the first graduate course taken at Lewis University for the D.Eng. in Data Science degree. Students remain under the requirement of the catalog in effect at the time of matriculation unless they discontinue attendance for two consecutive years or more, in which case they will follow the catalog in effect upon their return.

Graduation Requirements

To complete the D.Eng. in Data Science degree without a prior Master's degree, a student must earn a minimum of 84 credit hours, but may need up to 93 credit hours depending on whether the student must take foundation courses. With a prior Master's degree in Data Science or a closely related field, a minimum of 54 credit hours are required. Students with a prior Master's degree may have their foundation and core coursework requirements waived, but may still need to take prerequisite courses which are required by any advanced and elective courses they will take. The core curriculum for the degree consists of 21 credit hours of coursework.

Advanced coursework requirement consists of additional 24 credit hours. The student must also take 21 credit hours of elective courses, which can be any graduate course not taken previously, but non-DATA-prefixed courses must be approved by the program director. Also, courses outside of the department must be approved by the chairperson of the department that offers that course. The last 18 credit hours are courses related to the doctoral project. Students must pass a qualifying examination, get an accepted project proposal, and defend their project in front of a committee.

Qualifying Examination Requirement

In addition to coursework, the program requires that the student pass a Qualifying Examination. This examination will assess the student's knowledge in Data Science. This examination is prepared and administered by the ECaMS department and has to be passed before the end of the second academic year in the program. The student has two attempts to pass the Qualifying exam within the first two academic years after starting the program. The details of the qualifying examination will be provided by the ECaMS department. In lieu of the exam provided by the ECaMS department, the student may instead apply and receive a professional certification from an approved list, as determined by the ECaMS department.

Doctoral Project Requirement

The program will require students to work on an applied project in which data science methods are used for a real-world problem. We encourage this problem to be a service-based project, in which the student will work with non-data science faculty members, non-profit organizations, or other such entities, to help them make use of the latest data science techniques to leverage their data and provide a tangible benefit to the community. The work on this project will be done over six courses. The first two will focus on the project proposal. To successfully finish these two courses, students will need to get their project proposal approved by the project committee, consisting of their instructor, a separate advisor from the ECaMS department, and one outside member. Once the project is approved, the student will take three subsequent courses that will focus on the project implementation. Finally, the last project course will focus on writing of the project report, dissemination of the results, and an oral presentation in which the project will be defended in front of the project committee.

Requirements

Degree Offered: Doctor of Engineering
Total Credit Hours: 54-93

Code	Title	Hours
Foundation Courses [1]		
CPSC 50100	Programming Fundamentals	3
DATA 50000	Mathematics for Data Scientists	3
DATA 50100	Probability and Statistics for Data Scientists	3
Core Courses [2]		
DATA 51000	Data Mining and Analytics	3
DATA 51100	Statistical Programming	3
DATA 51200	Multivariate Data Analysis	3
DATA 53000	Data Visualization	3
DATA 54000	Large-Scale Data Storage Systems	3
DATA 55000	Supervised Machine Learning	3
DATA 55100	Unsupervised Machine Learning	3
Advanced Core Courses [3]		
DATA 56000	Neural Networks and Deep Learning	3
DATA 56600	Digital Image Processing	3
DATA 61000	Advanced Data Mining and Prescriptive Analytics	3
DATA 64000	Data Engineering	3
DATA 75000	Network Data Analysis	3
DATA 76000	Spatial and Temporal Data Analysis	3
DATA 77000	Recommender Systems	3
DATA 78000	Data Protection and Ethics	3
Electives		
Any 50000-level or above DATA course that has not been used to satisfy Foundation, Core, or Advanced Core requirements. [4]		12-21
Doctoral Project Courses		
DATA 79001	Doctoral Project Proposal 1	3
DATA 79002	Doctoral Project Proposal 2	3
DATA 79501	Doctoral Project Implementation 1	3
DATA 79502	Doctoral Project Implementation 2	3

DATA 79503	Doctoral Project Implementation 3	3
DATA 79900	Doctoral Project Presentation	3

1 Foundation courses are waived for those with a prior Master's degree in Data Science or a closely related field, and for those students who have sufficient prior background, as determined by the department and program director.

2 Core courses are waived for those with a prior Master's degree in Data Science or a closely related field.

3 Students admitted to the program with a degree other than M.S. in Data Science from Lewis University, may need to take additional courses to satisfy prerequisite requirements for the advanced core and elective coursework. The prerequisites for the advanced core courses include DATA 50000, DATA 51000, DATA 51100, DATA 54000, and DATA 55000.

4 Non-DATA courses must be approved by the program director. Courses outside of the ECaMS department must also be approved by the chairperson of the department in which those courses are offered. A maximum of 12 credit hours may be taken from outside of the ECaMS department. Students with a prior Master's degree in Data Science or a closely related field need to take at least 12 credit hours of electives, while those without such a prior degree need at least 21 credit hours of elective coursework.

Additional Admission Requirements Full Admission

To be accepted for admission into the program, a student must present the following credentials:

1. A baccalaureate degree from a regionally-accredited institution of higher education. A Master's degree in Data Science or a closely related field is required for waiving the foundation and core course requirements.
2. A minimum undergraduate GPA of 3.0 on a 4.0 scale.
3. An application for graduate admission, accompanied by an application fee.
4. Professional résumé.
5. Official transcripts from all institutions of higher education attended.
6. A two-page statement of purpose.
7. Two letters of recommendation.
8. Undergraduate mathematics coursework in Calculus[1].

1 With regard to the Calculus requirement, note that intimate, immediate familiarity with Calculus is not expected, but students should have worked with integrals and derivatives at some point in their academic preparation.

Please note: International students are required to have a TOEFL test score greater than 550 (computer-based 213; Internet-based 79).

Provisional Admission

Under certain circumstances, students who do not meet the GPA requirement (GPA below 3.0, but above 2.5) for full admission may request to be admitted to the program on a provisional basis. Provisionally-admitted students must complete the first nine semester hours of graduate study with a GPA of 3.0 or higher. After nine hours of completed coursework, a provisionally-accepted student's application will be reviewed again for full admission. This decision will be made by the Graduate Program Director in consultation with the Graduate Affairs Committee of the College of Aviation, Science, and Technology.

Student-at-Large

A student-at-large is not a degree candidate. In order to be admitted as a student-at-large, the applicant must submit official documentation of a baccalaureate degree from a regionally-accredited institution of higher education and complete a modified application form. The decision to admit an at-large student to graduate courses will be determined to the Graduate Program Director, whose decision is based on an evaluation of the applicant's undergraduate coursework and possibly an interview. However, should the student decide to apply for a full admission status at a later time, but within five years of course completion, only a maximum of nine semester hours of graduate coursework completed as a student-at-large can be applied toward an advanced degree, and only courses with grades of B or better will count toward the degree.

Transfer of Graduate Credit

A student entering the D.Eng. program in Data Science program with appropriate prior graduate coursework in data science, which was not used as part of a previously earned graduate degree, may have a maximum of 12 credit hours applied to the D.Eng. in Data Science degree. Course credits eligible for transfer consideration must meet the following criteria:

1. All transfer credit must have been earned prior to matriculation in the D.Eng. in Data Science program.
2. The coursework must have been completed at a regionally-accredited graduate school.
3. A minimum grade of B must have been earned for the course.
4. The coursework must have an equivalent course(s) in the D.Eng. in Data Science curriculum at Lewis University.
5. Courses from outside the United States will be considered if they are evaluated as graduate level by the Office of Admission or the Commission on Accreditation of the American Council on Education.
6. Credit for prior learning is not awarded for graduate courses.

International Students

International students are required to meet all the admission requirements for full or provisional admission and also the admission requirements specified in the Admission Policies section (https://catalog.lewisu.edu/graduate/general-information/admission-policies/) of this Catalog entitled "Entering International Students."