

Data Science

Data Science

Data Science Degrees

Data Science Major (BS)

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Data is being generated at all times, arriving from multiple sources at an incredible rate. Nearly every device connected to the internet is generating data, and those capable of analysis and study of it are increasingly in demand. The ongoing generation of “big data” has resulted in a new job market: business leaders, scientists, engineers, and leaders from all walks of life have realized that they need scientists with the knowledge and ability to analyze, and understand the implications of the data and then communicate their findings. In addition to the data that is being constantly generated through modern commercial use of the internet, an abundance of data has been in existence for some time. The proper study and understanding of the implications of this data is increasingly important.

The Lyon College Data Science program will provide students with the theoretical background and initial problem-solving experiences focusing on three general broad areas: science, business and economics, and social sciences and humanities.

NOTE: To graduate with a Bachelor of Arts or Bachelor of Science degree from Lyon College, students must successfully complete a minimum of 120 semester credit hours comprised of our required Core curriculum (44-48 hours), the requirements of at least one major (credit hours vary per major), and a selection of our Liberal Arts electives. They must also earn at least a 2.00 cumulative grade point average for all work taken at Lyon College and a 2.00 cumulative grade point average in their major, minor, and concentration.

Summary of Requirements for a Major in Data Science

Computer Science Core Competence

Item #	Title	Credits
	CSC 100, CSC 109, or CSC 115	3
MTH 115	Discrete Mathematics	3
CSC 245	Introduction to Digital Logic	3
CSC 265	Algorithms	3
CSC 330	Database Theory and Application	3

Math Core Competence

Item #	Title	Credits
MTH 210	Calculus I	4
MTH 220	Calculus II	4
MTH 330	Linear Algebra	3
	MTH 360 or BUS 323	3
	CSC 415 or MTH 415	3

Data Science Core Competence

Item #	Title	Credits
DSC 105	Introduction to Data Science	3
DSC 205	Introduction to Advanced Data Science	4

Data Science Specialization - Two Courses

Item #	Title	Credits
DSC 302	Data Visualization	3
DSC 305	Machine Learning	3
DSC 401	Data Science Applications and Programming	3
DSC 450	Data Science Independent Study	3
DSC 482	Data Science Special Topics	3

Requirements for Science Track

Item #	Title	Credits
	Data Science Elective Group - Science Track	9-12
	Data Science Independent Study Lab	3

Requirements for Business & Economics Track

Item #	Title	Credits
	Data Science Elective Group - Business & Economics Track	15

Requirements for Social Sciences/Humanities/Fine Arts Track

Item #	Title	Credits
CSC 105	Digital Humanities	3
	Data Science Independent Study Lab	3
	Data Science Elective Group - Social Sciences/Humanities/Fine Arts	6

CORE CURRICULUM

Item #	Title	Credits
	Core Curriculum Requirements (In addition to Major hours)	44-48

CSC 100, CSC 109, or CSC 115

One of the following:

Item #	Title	Credits
CSC 100	Introduction to Programming in C++	3
CSC 109	Introduction to Programming in Python	3
CSC 115	Introduction to Programming in Java	3

MTH 360 or BUS 323

Item #	Title	Credits
MTH 360	Probability and Statistics	3
BUS 323	Statistical Applications to Business Decision Making	3

CSC 415 or MTH 415

Item #	Title	Credits
CSC 415	Numerical Analysis	3
MTH 415	Numerical Analysis	3

Data Science Elective Group - Science Track

The student will take three science (BIO/CHM/PHY) classes at the 200 level or above.

The student will enroll in DSC 450, 1 hour, and participate in a course-related project under the supervision of the advisor and the professor for each class.

Data Science Independent Study Lab

For each class, the student will take a DS lab (1 hour) with a course related project.

Independent Study Lab

Item #	Title	Credits
DSC 450	Data Science Independent Study	3

Data Science Elective Group - Business & Economics Track

The student will meet requirements for a minor in Business and Economics OR complete the following classes:

Business & Economics Track

Item #	Title	Credits
ECO 101	Principles of Economics I	3
ECO 102	Principles of Economics II	3
ACC 210	Financial Accounting	3
ACC 211	Managerial Accounting	3
ECO 306	Econometrics	3

Data Science Elective Group - Social Sciences/Humanities/Fine Arts

With approval from your advisor and the professor for each class, the student will complete two classes from either Social Science, Humanities, or Fine Arts divisions. (ANT/ART/ENG/FRN/HIS/JRN/MUS/POL/RPH/SPN)

For each class, the student will take a DS lab (1 hr) with a course-related project.

Data Science Minor

Summary of Requirements for a Minor in Data Science

Item #	Title	Credits
DSC 105	Introduction to Data Science	3
	CSC 100, CSC 109, or CSC 115	3
	MTH 115 or MTH 290	3
DSC 205	Introduction to Advanced Data Science	4
CSC 240	Data Structures with C++	3
DSC 302	Data Visualization	3
CSC 330	Database Theory and Application	3
	Data Science Minor Elective	3
	Total Credits	25

CSC 100, CSC 109, or CSC 115

One of the following:

Item #	Title	Credits
CSC 100	Introduction to Programming in C++	3
CSC 109	Introduction to Programming in Python	3
CSC 115	Introduction to Programming in Java	3

MTH 115 or MTH 290

Item #	Title	Credits
MTH 115	Discrete Mathematics	3
MTH 290	Foundations of Modern Mathematics	3

Data Science Minor Elective

Item #	Title	Credits
CSC 265	Algorithms	3
MTH 330	Linear Algebra	3
MTH 360	Probability and Statistics	3
CSC 415	Numerical Analysis	3
DSC 305	Machine Learning	3
DSC 482	Data Science Special Topics	3

Data Science (DSC) Courses

DSC 105: Introduction to Data Science

This course provides a general overview of the common topics in the data science domain. Students are introduced to data collection, data engineering, machine learning algorithms and packages, data visualization techniques and related programming tools and frameworks.

Credits 3

Prerequisites

CSC 100, CSC 109, or CSC 115, **and** MTH 210 or MTH 115

DSC 205: Introduction to Advanced Data Science

Data collection, data engineering, machine learning algorithms and packages, data visualization, and related programming tools and frameworks. These topics are covered in DSC 101, but here they will be discussed in more depth, and projects will reflect real world challenges. In addition, data mining techniques and more advanced machine learning algorithms will be introduced. In some cases, the statistical concepts behind some of the algorithms will be discussed. Projects may involve text and image classification tasks, developing regression models, etc.

Credits 4

Prerequisites

DSC 105 or CSC 109

DSC 302: Data Visualization

This course presents the art and science of turning data into readable graphics. We'll explore the design and creation of data visualizations based on data available and tasks to be achieved. This process includes data modeling, data processing, mapping data attributes to graphical attributes, and strategic visual encoding. Students will evaluate the effectiveness of visualization designs and create their own data visualizations.

Credits 3

Prerequisites

CSC 100, CSC 115, or consent of the instructor.

DSC 305: Machine Learning

This course aims at providing mathematical explanations of the machine learning models discussed in DSC101 and DSC201. Topics include probability, probabilistic models, statistical concepts related to machine learning, and analysis of some of the popular machine learning models with the help of probability and statistics. Projects will reflect real world challenges and will aim at discovering how machine learning models work.

Credits 3

Prerequisites

DSC 105, DSC 205 or CSC 265

DSC 401: Data Science Applications and Programming

This course will offer programming languages and techniques necessary to process and analyze data. Special emphasis will be on advanced use of Python and R languages to analyze datasets from a variety of disciplines and industries.

Credits 3

Prerequisites

CSC 245

DSC 402: Data Science Capstone

Students will apply their data science knowledge and technology to a real world scenario. Students can accomplish this by working with a local businesses, acquiring data from governmental entities, or through an internship. The capstone will conclude with a final deliverable report and presentation to the business, government, or internship entity.

Credits 3

DSC 450: Data Science Independent Study

Individual work on special topics in data science.

Credits 3

DSC 482: Data Science Special Topics

Study of selected topics in data science.

Credits 3

Prerequisites

Prerequisites will vary depending on course.