

# INTRODUCTION TO DATA SCIENCE CERTIFICATE

This 3-course certificate introduces students to the key elements of Data Science: Python programming, SQL & database design, data processing, and analysis & visualization. The certificate provides any professional valuable, widely applicable, and transferable skills.

Coursework explores the topics of data ethics and digital ethics. The certificate is intended to help prepare the student for a dynamic career in data analytic work, whether they seek to grow their existing career, switch to a career within the data science realm, or explore data science as a field before committing to a degree program or advanced study in the topic.

## Related Programs

### Major

- Data Science (BS) (<https://catalog.luc.edu/undergraduate/arts-sciences/data-science/data-science-bs/>)

### Certificate

- Computer Science Certificate (<https://catalog.luc.edu/undergraduate/continuing-professional-studies/computer-science-certificate/>)

### Combined

- Data Science (BS/MS) (<https://catalog.luc.edu/undergraduate/accelerated-bachelors-masters-program/data-science-bsms/>)

## Curriculum

Code	Title	Hours
<b>Certificate Requirements</b>		
COMP 251	Introduction to Database Systems	3
CPST 291	Dynamic Programming Languages	3
CPST 325	Data Processing, Analysis, and Visualization	3
<b>Total Hours</b>		<b>9</b>

Optional:

- CPST 265 Special Topics – 1-3 credits of directed study. Student will solve a data science problem for a community non-profit organization under the guidance of a faculty member. Larger projects will be 3 credit hours held only on the 16-week semester schedule for either fall or spring. Summer will not be an option for a 3-credit hour special topics course. Interested students should start the process at least 6-weeks before the semester where you will potentially complete the course.

## Suggested Sequence of Courses

The School of Continuing and Professional Studies provides a high-touch advising model in order to incorporate the professional and educational outcomes of the student as well as any transfer credit accepted. In order to provide students with maximum flexibility in their education and because everyone's academic background will vary, advisors will work directly with students to determine an appropriate sequence of courses starting at admission into their respective program based on their needs and expected time to completion.

## Learning Outcomes

Upon completion of the certificate, graduates will be able to:

- Create data analytic programs that perform rigorous statistical analyses to address real-world questions in the social sciences.
- Evaluate datasets to determine how variables have been measured and encoded, which statistical analyses can be performed upon them, and which data cleaning and preparation protocols are necessary in order to proceed.
- Apply the relational model to solving real-world problems using SQL on standard DBMS platforms.
- Apply the programming languages of Python and SQL to specific data analytic and visualization challenges, as well as to generate novel code.
- Analyze the ethical considerations relevant to accurate data analysis and reporting.