UNIVERSITY of WASHINGTON
eScience Institute
ADVANCING DATA-INTENSIVE DISCOVERY IN ALL FIELDS

Data Science Education

A University-Wide Approach

Our society's ability to generate data is growing at an unprecedented rate. Data analysis is at the heart of many research advances and industrial innovations. As a result, data science education is critical to meet growing workforce needs and to meet the needs of modern scientists. ***Therefore, we consider data science to be a critical component of student education in whatever major they choose to pursue.***

The eScience Institute Education Working Group pioneered the adoption of data science specializations within existing majors. These specializations are called "options" and are listed on student transcripts. We have identified a core set of skills that form the heart of data science education but also recognize that data science education needs to be discipline-specific. Students acquire the skills and knowledge to both utilize data science methods and contribute to the state-of-the-art in data science for their discipline. *Students from departments or schools not currently offering a specialization are encouraged to take data science courses as electives within their existing major - several courses have no pre-requisites.*

Data Science specializations within departments and schools across campus

(details about each option and specific courses are listed on reverse side)

Undergraduate Data Science Options

The eScience Institute Education Working Group has brought departments together to create a template for a scalable, university-wide program.

The number of disciplines offering specializations following this template is growing quickly.

Several new undergraduate data science courses have no pre-requisites and are open all students.

Graduate Level Data Science – 2 Options

Data Science Option – targets students who seek to learn data science methods and how to use data science tools.

Advanced Data Science Option - targets students who seek to develop new data science methods and build new data science tools.

Professional Master of Data Science

The University of Washington's **Master of Science in Data Science** gives current and aspiring data science professionals the technical skills needed to extract insights from large, noisy and heterogeneous datasets – and the practical skills to make analytics easy to understand and use.

The eScience Institute also offers many informal data science education opportunities such as drop-in office hours, Software Carpentry workshops, hack weeks, and more.

Undergraduate Data Science Options

Interested departments extend their core major programs with a “Data Science Option”. Each data science specialization covers the same set of core data science topics, detailed below. Each department chooses how best to cover the below topics in a way that makes most sense for their students. Departments also have additional, domain-specific requirements.

Required areas with recommended courses:

- **Programming**: e.g. CSE163 or CSE143
- **Machine learning**: e.g. CSE416/STAT416, STAT435, INFO 371
- **Societal implications of data science**: e.g. SOC 225 "Data & Society"

Required to cover at least two areas:

- **Data management**: e.g. CSE414 or INFO 445
- **Data visualization and communication**: e.g. CSE412, INFO474, or HCDE411
- **Advanced statistics and probability**: Department-specific course choices

Optional:

- **Introduction to data science**: e.g. STAT180/CSE180/INFO180
- Other department-specific requirements

Graduate Data Science Options

The goal of this option is to educate students in the foundations of data science. This option aims to educate the next generation of thought leaders who will apply new data science methods in their fields of inquiry.

To complete the “Data Science” option, students take **at least three courses out of the following four areas, each course from a different area:**

Software Development for Data Science: *CSE 583 or ChemE 546* or *department specific*

Statistics and Machine Learning: *CSE416 / STAT 416 or STAT 435 or CSE 546 or STAT 535 or STAT 509 or* STAT 512-513 or department specific

Data Management and Data Visualization: *CSE 414 or CSE 544 or CSE 442 or CSE 412 or CSE 512 or INFX 562 or INFO474 or HCDE/DATA 511 or HCDE411*

Department Specific requirement as related to data science. Participating departments may identify specific data science related courses offered through their program that can be used to fulfill this requirement.

Students must also register for at least 2 quarters in the weekly **eScience Community Seminar,** CHEM E 599**.**

Advanced Graduate Data Science Options

The goal of this option is to educate the next generation of data science methods developers and tool builders. The core of our educational approach is a comprehensive interdisciplinary, multifaceted practical training program.

***Participants select three out of four* of the following core courses:**

Data Management: CSE 544.
Machine Learning, CSE 546 or STAT 535.
Data Visualization: CSE 512.
Statistics: STAT 509 or STAT 512-513.

Additionally, to further expand students’ education and create a campus-wide community, students register for **at least 4 quarters** in the weekly **eScience Community Seminar**, CHEM E 599.

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Find more information at:
http://escience.washington.edu/education/
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