

# Data Science (MS)

The master of science (MS) in data science at the University of Oregon prepares students to effectively use data to make positive change in the world. To do this, a data scientist must engage with the bigger picture, from data sourcing and curation through goal formulation to outcome evaluation and communication.

Our program equips students with both expertise in cutting edge data science methodology, and the broader competencies needed to work across diverse teams and real-world applications. These enduring skills help graduates achieve long-term career goals and thrive as effective data scientists in any setting.

The MS in data science enables students from a wide variety of academic and professional backgrounds to achieve mastery of data science techniques in as little as one year. Students in the program work with real-world data to formulate and implement models and analyses, gain experience with modern predictive and inferential toolsets, communicate complex analyses intuitively to stakeholders, and skillfully navigate social and ethical dimensions of data-based decision-making.

Whether you're bound for a career as a data analyst at a Fortune 500, doing fundamental science, or informing local decision-making, we have room in our program for your background, interests, and goals.

## Program Information and Admission Process

Please visit the department's website (<https://scds.uoregon.edu/ds/graduate-programs/ds-masters>).

## Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Be capable of working with a diverse range of data structures, formats, and sizes, and be able to implement clear, reproducible workflows for data cleaning and manipulation with appropriate tools, including AI-assisted and automated systems.
- Have a comprehensive toolbox of computational proficiencies, and a readiness to learn new skills as necessary and leverage rapidly developing AI technologies as necessary.
- Have a strong foundational and applied knowledge of statistical concepts, and understand how these concepts motivate varying approaches to data exploration and visualization, prediction, and inference.
- Based on data at hand, be able to ask tractable questions and formulate appropriate analyses by leveraging a wide range of modeling and optimization frameworks, with emphasis on predictive modeling and machine learning.
- Be able to skillfully carry out chosen analyses and rigorously assess outcomes. Have the ability to confidently evaluate analyses for appropriateness and accuracy, including existing and AI-generated pipelines.
- Be able to present otherwise complex analysis results in an intuitive, easily comprehensible manner, with actionable recommendations for diverse stakeholders.
- Appreciate and effectively assess the social, ethical, and legal dimensions of data and algorithm use. Be familiar with methods to

maintain privacy, enhance transparency, and avoid bias in algorithmic decision-making, statistical inference, and use of generative AI.

## Data Science Major Requirements

Courses used to fulfill the major requirements must be taken for a letter grade and passed with a grade of B- or better. Students may petition to replace a required course with another course (with the same number of units) if they can demonstrate equivalent prior work (for instance, by taking the course at UO).

| Code                                                                                                                                                        | Title                                             | Credits   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------|
| <b>Core courses - take all 6</b>                                                                                                                            |                                                   |           |
| DSCI 531                                                                                                                                                    | Data Access and Management                        | 4         |
| DSCI 535                                                                                                                                                    | Data Mining, Exploration, and Visualization       | 4         |
| DSCI 632                                                                                                                                                    | Statistics for Data Science                       | 4         |
| DSCI 633                                                                                                                                                    | Machine Learning I                                | 4         |
| DSCI 634                                                                                                                                                    | Machine Learning II                               | 4         |
| PHIL 623                                                                                                                                                    | Data Ethics                                       | 4         |
| <b>Elective courses - take any 3; the following is a list of pre-approved courses, but others can be substituted with approval of the Graduate Advisor:</b> |                                                   | <b>12</b> |
| ACTG 580                                                                                                                                                    | Accounting Data Analytics I                       |           |
| ACTG 681                                                                                                                                                    | Accounting Data and Analytics II                  |           |
| BI 561                                                                                                                                                      | Systems Neuroscience                              |           |
| CH 547                                                                                                                                                      | Computational Chemistry                           |           |
| CS 571                                                                                                                                                      | Introduction to Artificial Intelligence           |           |
| CS 573                                                                                                                                                      | Probabilistic Methods for Artificial Intelligence |           |
| EC 522                                                                                                                                                      | Economic Forecasting                              |           |
| EC 523                                                                                                                                                      | Econometrics                                      |           |
| EC 527                                                                                                                                                      | Games and Decisions                               |           |
| ERTH 518                                                                                                                                                    | Earth and Environmental Data Analysis             |           |
| GEOG 581                                                                                                                                                    | GIScience I                                       |           |
| GEOG 582                                                                                                                                                    | GIScience II                                      |           |
| GEOG 585                                                                                                                                                    | Remote Sensing I                                  |           |
| GEOG 586                                                                                                                                                    | Remote Sensing II                                 |           |
| GEOG 591                                                                                                                                                    | Advanced Geographic Information Systems           |           |
| GEOG 594                                                                                                                                                    | Spatial Analysis                                  |           |
| GEOG 595                                                                                                                                                    | Geographic Data Analysis                          |           |
| JCOM 642                                                                                                                                                    | Quantitative Research Methods                     |           |
| MKTG 515                                                                                                                                                    | Marketing Analytics                               |           |
| PSY 512                                                                                                                                                     | Applied Data Analysis                             |           |
| PSY 558                                                                                                                                                     | Decision-Making                                   |           |
| <b>Research/Internship - minimum of 9 credits selected from one or more of the following courses:</b>                                                       |                                                   | <b>9</b>  |
| DSCI 601                                                                                                                                                    | Research: [Topic]                                 |           |
| DSCI 604                                                                                                                                                    | Internship: [Topic]                               |           |
| DSCI 636                                                                                                                                                    | Synthetic Project Capstone                        |           |
| <b>Total Credits</b>                                                                                                                                        |                                                   | <b>45</b> |