

# Master of Data Science

The Master of Data Science (MDS) prepares students for careers as Data Scientists in high-technology industries, business, and government. The MDS is an interdisciplinary degree program that provides foundational knowledge in statistics, machine learning, and computer science. Students learn core knowledge in probability and statistics, programming, data management, data analysis and visualization, and interpretation of empirical results. During the final quarter, students participate in two capstone courses. A critical component of the generation and analysis of empirical data is the ability to document the methodology and design employed, provide interpretable results, and communicate the salient findings of the analysis to a broad audience.

The first capstone course consists of the development an empirically-driven solution to a real-world problem. The project will cover the full spectrum of the analytic process, ranging from data gathering, manipulation, visualization, analysis, and interpretation of results. The second capstone course focuses on scientific writing and communication for presenting the analytic results of the capstone project to a broader audience. At the completion of this program, students will be able to obtain, manage, and analyze data from multiple sources and disciplines to yield empirically-driven solutions. Graduates will be well prepared to contribute to multi-disciplinary teams that rely on multiple types of data for guiding business and research decisions. They will be knowledgeable about the techniques for obtaining, cleaning, and managing data, statistical and machine learning methodologies for analyzing data and building associative and predictive models, and communicating the impact of results to collaborators and teams. The program can be completed through two pathways: full-time (15 months) and part-time (approximately two years). The part-time program is only available to domestic candidates.

Applicants are evaluated on the basis of their prior academic record and letters of reference from people either in the student's academic history or work settings. Students applying to the program may have degrees in any field, though preference will generally be given to those with degree in STEM fields including data science, computer science, statistics or biostatistics, computer or electrical engineering. All applicants are evaluated on the materials submitted: letters of recommendation, official college transcripts, and personal statement(s).

We strongly encourage all applicants to additionally submit either official GRE test scores or a relevant work portfolio (staff support is budgeted into our program to help us process these). For more information, contact the MDS Program at 949-824-2824 or mds@ics.uci.edu.

All MDS students are expected to maintain a minimum GPA of 3.0 throughout the program with no individual grade lower than a "B."

## Course Requirements

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| A. Complete:   |  |
| COMPSCI 220P   | Databases and Data Management                          |
| COMPSCI 260P   | Algorithms with Applications                           |
| COMPSCI 273P   | Machine Learning and Data Mining                       |
| DATA 200AP   | Intermediate Probability and Statistical Theory I      |
| DATA 200BP   | Intermediate Probability and Statistical Theory II     |
| DATA 210P  | Statistical Methods I                                  |
| DATA 211P  | Statistical Methods II                                 |
| B. Complete:   |  |
| DATA 200P  | Data Science Career Seminar                            |
| DATA 296P  | Capstone Writing and Communication                     |
| DATA 297P  | Capstone Design and Analysis                           |
| DATA 298P  | Curricular Practical Training                          |
| or DATA 299P   | Individual Study                                       |
| C. Select at least three courses from the following: |  |
| COMPSCI 222P   | Principles of Data Management                          |
| COMPSCI 223P   | Transaction Processing and Distributed Data Management |
| COMPSCI 224P   | Big Data Management                                    |
| COMPSCI 261P   | Data Structures with Applications                      |
| COMPSCI 271P   | Artificial Intelligence                                |
| COMPSCI 274P   | Neural Networks and Deep Learning                      |
| COMPSCI 275P   | Graphical Models and Statistical Learning              |
| STATS 205P   | Bayesian Data Analysis                                 |
| STATS 240P   | Multivariate Statistical Methods                       |
| STATS 245P   | Time Series Analysis                                   |

|              |                                      |
|--------------|--------------------------------------|
| STATS 262P   | Theory and Practice of Sample Survey |
| STATS 270P   | Stochastic Processes                 |
| COMPSCI 201P | Computer Security                    |
| DATA 295P    | Special Topics in Data Science       |

## Final Examination

The final examination includes two components:

- Performance on a capstone project that incorporates skills and knowledge from the entire program.
- Presentation and communication of the capstone project.

## Normative Time

Students making normal progress are expected to complete the degree program in approximately 15 months (5 quarters).

## Course Substitutions

A student who has taken relevant graduate courses at UCI or another university may petition to have a specific course certified as equivalent to one that satisfies this program. The petition should describe the course and should be approved by the MDS program director. Only two courses can be substituted.