

DATA SCIENCE (PROFESSIONAL CERTIFICATE)

Overview

Award: Professional Certificate
Program of Study: Data Science
Program Code: 1703

Data science is an interdisciplinary process that uses scientific methods, algorithms, and automated systems to transform data into information to gain knowledge from noisy structured and unstructured data. Data science also expands knowledge of statistical data analysis techniques utilized in business decision-making. This certificate program explores concepts and techniques of knowledge extraction/discovery to derive actionable insights from data. This program prepares students to apply quantitative modeling and data analysis techniques to solve real-world business problems, communicate findings, and effectively present results using data visualization techniques.

All CMU certificate graduates are expected to demonstrate proficiency in specialized knowledge/applied learning, critical thinking, and personal and social responsibility. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

1. Make and defend assertions about a specialized topic in an extended well-organized document and an oral presentation that is appropriate to the discipline. (Specialized Knowledge, Communication Fluency)
2. Analyze data critically, reason logically, and apply quantitative analysis methods correctly to develop appropriate conclusions. (Critical Thinking, Quantitative Fluency)
3. Reflect on and respond to ethical, social, civic, and/or environmental challenges at local, national, and/or global levels. (Personal and Social Responsibility)

Requirements

Each section below contains details about the requirements for this program. Select a header to expand the information/requirements for that particular section of the program's requirements.

To print or save an overview of this program's information, including the program description, learning outcomes, requirements, suggested course sequencing (if applicable), and advising and graduation information, scroll to the bottom of the left-hand navigation menu and select "Print Options." This will give you the options to either "Send Page to Printer" or "Download PDF of This Page." The "Download PDF of This Page" option prepares a much more concise presentation of all program information. The PDF is also printable and may be preferable due to its brevity.

Institutional Degree Requirements

The following institutional requirements apply to all CMU Professional Certificates. Specific programs may have different requirements that must be met in addition to institutional requirements.

- Consists of 5-59 semester hours.
- Primarily 300-400 level courses.
- At least fifty percent of the credit hours must be taken at CMU.

- 2.00 cumulative GPA or higher in all courses taken to satisfy program requirements.
- A grade lower than "C" in the program of study will not be counted toward meeting the certificate's requirements.
- A course may only be used to fulfill one requirement for each degree/certificate.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Certificate Requirements.
- The Catalog Year determines which program sheet and certificate requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See "Requirements for Undergraduate Degrees and Certificates" in the catalog for a complete list of graduation requirements.

Specific to this degree:

- 21 credit hours are required for the Professional Certificate in Data Science.
- Program admission requirements include:
 - MATH 131 or MATH 135 or MATH 151
 - STAT 200 or STAT 215 or STAT 241 or CISB 241
 - CSCI 112

Program Specific Requirements

(21 Semester Hours)

Code	Title	Semester Credit Hours
CSCI 110	Beginning Programming	3
CSCI 365	Data Mining	3
CSCI 425	Python Machine Learning	3
MATH 225	Computational Linear Algebra	3
STAT 301	Computational Statistics	3
STAT 312	Correlation and Regression	3
Select three hours from the following:		3
CISB 342	Data Mining and Visualization ¹	
MATH 361	Numerical Analysis ²	
MATH 362	Fourier Analysis ²	
Total Semester Credit Hours		21

¹ Since CISB 241/STAT 241 are equivalent courses, either may be used to satisfy the prerequisite.

² This course requires a prerequisite.

Suggested Course Plan

First Year	Fall Semester	Semester Credit Hours
CSCI 110	Beginning Programming	3
MATH 225	Computational Linear Algebra	3
STAT 301	Computational Statistics	3
Semester Credit Hours		9

Spring Semester		
STAT 312	Correlation and Regression	3
CSCI 365	Data Mining	3
Complete one of the following:		3
CISB 342	Data Mining and Visualization	
MATH 361	Numerical Analysis	
MATH 362	Fourier Analysis	
Semester Credit Hours		9
Second Year		
Spring Semester		
CSCI 425	Python Machine Learning	3
Semester Credit Hours		3
Total Semester Credit Hours		21

Advising and Graduation

Advising Process and DegreeWorks

Documentation on the pages related to this program is intended for informational purposes to help determine what courses and associated requirements are needed to earn a certificate. Some courses are critical to complete in specific semesters while others may be moved around. Meeting with an academic advisor is essential in planning courses and discussing the suggested course sequencing. It is ultimately the student's responsibility to understand and fulfill the requirements for their intended certificate.

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar's Office to evaluate progress towards a certificate and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar's Office.

Graduation Process

Students must complete the following in the first two months of the semester prior to completing their certificate requirements (for one-semester certificates, complete in the first week of class):

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the "Intent to Graduate" form to the Registrar's Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found on the [Graduation](#) web page.

If a student's petition for graduation is denied, it will be their responsibility to apply for graduation in a subsequent semester. A student's "Intent to Graduate" does not automatically move to a later graduation date.