

Data Science Foundations Course Pilot

Course Description

Target Student

Data Science Foundations is beneficial for students who need a third or fourth credit in mathematics and are not intending to pursue a career that requires calculus. It is appropriate for students with limited or no prior programming, statistics, and data analytics knowledge. This course is ideal for absolute beginners, who want to acquire a basic working knowledge of data science. Data Science Foundations is designed to be a hands-on course that promotes reasoning using the standards for mathematical practice.

This course would be especially appropriate for a student who has the following characteristics:

- Anticipates a career in behavioral sciences;
- Anticipates a career in the emerging fields of computer science, computational data analysis and/or statistics;
- Is interested in applied fields of study which use mathematics;
- Enjoys exploring engaging, real-world issues involving data;
- Desires to become a better-informed citizen;
- Plans on pursuing a pathway that does not require calculus; and/or
- Plans on pursuing computer technology or STEM fields in a postsecondary institution.

This course will prepare students to enter directly into a credit-bearing math course at the postsecondary level or to go directly into a career field.

Description of Course

The course teaches students to reason with and think critically about data in all forms. Ohio's Learning Standards for Mathematics relevant to data science are taught along with the data demands of good citizenship in the 21st century. Although this course still is being developed, it may include things such as describing big data; usability and usefulness of data; structured vs unstructured data; data extraction techniques; data storage; privacy issues; and data mining.

Course Pathways

The pilot will be a yearlong course and can be considered an Algebra 2 equivalent (A2E) course. The pilot will explore multiple pathways for the future, such as the following:

- A one-credit course;
- A one-credit course followed by another high school math course such as Algebra 2 or an Algebra 2 equivalent course (Statistics & Probability, Quantitative Reasoning, Computer Science/Discrete Math);
- A one-credit course followed by a College Credit Plus (CCP) math course. Although students deemed remediation-free can take any CCP course, this course lends itself nicely to CCP Quantitative Reasoning, CCP Introductory Statistics or CCP Data Science (OTM learning outcomes still being published); or
- A one-credit course followed by an AP math course; this course lends itself nicely to prepare students for an AP Statistics and Probability course or an AP Computer Science course.

Student Eligibility

Prior to enrollment, it is recommended that students complete the following:

- At least two units of credit in high school mathematics; and
- Algebra and Geometry end-of-course state tests or Math 1 and Math 2 end-of-course state tests.

Professional Learning

It is imperative that teachers who teach this course participate in the accompanying professional learning opportunities. These may include face-to-face meetings and virtual hangouts. Piloting teachers will be expected to attend a multi-day professional learning session in the summer preceding the course pilot and ongoing professional development throughout the school year. Administrators will have an informational meeting during the summer.

Data Collection and Evaluation

Schools/districts participating in the pilot will be expected to collect data on their students. Specifics are still being determined but may include evaluation tools such as ACT/SAT scores, pre- and post-growth mindset tests, pre- and post- tests and/or student reflection statements. Pilot teachers also may be required to provide documentation that they implemented the lessons that were created by the workgroup with fidelity. In addition, there may be people such as higher education or career collaborators, Ohio Department of Education staff, members of the research team and/or others interested in the pilot course periodically visiting the classrooms to observe the lessons.

Overall Timeline

- 2020-2021 school year
 - *Begin development of the course.*
- 2021-2022 school year
 - *Implement full pilot.*
- 2022-2023 school year
 - *Launch course Phase 1.*
- 2023-2024 school year
 - *Launch course Phase 2.*

Policy Environment

It is strongly recommended this course be offered as a one credit math course for a third or fourth math credit. A full mathematics credit should be granted to a student successfully completing this course. This course satisfies a credit toward mathematics' graduation requirements and satisfies the requirement of an Algebra 2 equivalent course.

An example description of the course for a district course book:

Prerequisite: Algebra 1 and Geometry (or Math 1 and Math 2)

Time frame: One year

Grades: 10-12

Credit: 1.0

Acquiring foundational knowledge in data science and basic programming skills are the primary objectives and outcomes of the Data Science Foundations course. It includes the use of mathematics, statistics and computer science methods in the analysis and interpretation of data in all forms. In the context of real-world situations students will make predictions and decisions using data. Students combine problem solving and reasoning skills with statistics and modeling to analyze big data to find patterns and communicate meaning in data. Ohio's Learning Standards related to Statistics and Probability relevant to data science are taught along with the data demands of good citizenship in the 21st century. These habits and skills cut across disciplines, promote perseverance, and provide a gateway into successful postsecondary education and a variety of careers.