Discrete Math/Computer Science Course Pilot

Target Student
Discrete Math/Computer Science 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. This course is ideal for absolute beginners who want to acquire a basic working knowledge of computer science. Discrete Math/Computer Science is designed to be a hands-on course that promotes reasoning using the standards for mathematical practice.

The course is especially appropriate for a student who has the following characteristics:

- Anticipates a career in the emerging fields of computer science, computational data analysis or technology;
- Is interested in applied fields of study that use mathematics;
- Enjoys exploring mathematics in an engaging, hands-on environment;
- Plans on pursuing a pathway that does not require calculus; and/or
- Plans on pursuing computer technology or STEM fields at a postsecondary institution.

Students who succeed in this course may take an Algebra 2 (or other equivalent) course, College Credit Plus (CCP) course or Advanced Placement (AP) math course for their fourth unit of mathematics credit. Although students who take this course have flexibility in which follow-up math courses they take, this course pairs especially well with AP Computer Science A, AP Computer Science Principles, a CCP Discrete Math Course or a CCP Data Science course. Although, there are many careers in computer science or technology that do not require Calculus, if students become interested in an advanced degree in computer science that requires Calculus, they should take an Algebra 2 course in tandem with an AP Computer Science A course following this course.

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 that counts toward students' four units of mathematics;
- 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, Data Science Foundations);
- 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 Discrete Math, CCP Quantitative Reasoning, or CCP Data Science (Ohio Transfer Module learning outcomes still being published); or
- A one-credit course followed by an Advanced Placement (AP) math course. Discrete Math/Computer Science course lends itself nicely to prepares students for an AP Computer Science A or an AP Computer Science Principles course.

Note: Although, there are many careers in computer science or technology that do not require Calculus, if students become interested in an advanced degree in computer science that requires Calculus, they should take an Algebra 2 course in tandem with an AP Computer Science A course following this 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.

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 Discrete Mathematics and basic programming skills are the primary objectives and outcomes of the Discrete Math/Computer Science course. It uses mathematical reasoning and computational thinking in the context of JavaScript and unplugged activities to learn concepts of Discrete Mathematics. Ohio's Learning Standards related to Mathematics and Computer Science are taught along with the data demands of good citizenship in the 21st century. These habits and skills cut across disciplines and other languages, promote perseverance and provide a gateway to successful postsecondary education and a variety of careers. This course satisfies the credit requirement for Algebra 2.