Discrete Math Problem Solving

Course description
Discrete Math Problem Solving (DMPS) is an 11th grade, A-G approved, year-long math course beyond Algebra 1 and Geometry. The course provides an introduction to topics and concepts from discrete mathematics. The mathematical topics addressed in this course have the potential to **foster students' mathematical curiosity and advance their engagement in the Common Core Standards for Mathematical Practice**.
For more details, please view this document: DMPS Course Description for UCOP A-G .pdf

Who should take this course?
DMPS was designed for high school juniors or seniors who:

- Have passed Integrated Math 2 or Algebra I and Geometry with a grade of "C" or better
- Want an alternative to Integrated Math 3 or Algebra 2 as a third year of mathematics
- Are undecided about pursuing a STEM discipline at the college or university level

Is this course A-G approved?
DMPS is a "C" approved mathematics course.

How can a school adopt our courses?
For schools that wish to adopt our courses in the UCOP portal system,

- Log in your school's A-G Course Management Portal (CMP)
- Click Add a New Course and select Add a program course.
- Select our program, **Discrete Math Project Collaborative**, from the dropdown menu.
- Begin typing the course title **Discrete Math Problem Solving** and results will begin to populate.
- Select the course and click Continue.
- Complete the submission form and submit the course to UC or forward to your course/reference list manager to submit to UC.

Once the school has submitted this form, the course(s) would be adopted to the school's A-G list.

To view a list of our courses on UCOP website, go to
https://hs-articulation.ucop.edu/agcourselist/institution/5086.

If a student is successful in DMPS, what class would you advise them to take next?

Many students will enroll in Integrated 3, Algebra 2, Statistics or any Discrete Math course. The course will help them make a more informed decision about choosing STEM or Non-STEM fields of study.

What are the goals of the course?

1. To advance students' mathematical ways of thinking, as described in the CCSS Standards for Mathematical Practice, necessary for **success in college math, career, and life**.
2. To foster students' mathematical curiosity and to demonstrate how mathematics can solve authentic mathematical problems.
3. To help students acquire knowledge of *essential* and *desirable* mathematics content as defined by the Intersegmental Committee of the Academic Senates of the CCC, the CSU, and the UC's *Statement of Competencies in Mathematics* (2013).

What does a typical day in this course look like?

Each day students engage in problem solving. They **write**, engage in **sense-making**, propose and **refine definitions**, model with mathematics, **habitually ask "Why?"** and reason at a variety of levels of formality. Typically, DMPC lessons are active. Students play games, talk with peers during problem-solving activities, **present their thinking**, use manipulatives, and **write and reflect on their work and the work of their peers**. Many problems begin with a context and are eventually decontextualized. Students primarily **learn through problem-solving**, but brief lectures and note-taking sessions help wrap up lessons.

What mathematical content is studied?

- **Combinatorial Games:** How can students systematically explore a game, search for patterns, make conjectures, and construct & critique arguments?
- **Graph Theory:** How can exploring situations that can be modeled with vertex-edge graphs leverage students' existing mathematical understanding and advance their ability to reason deductively, communicate ideas, and make connections?
- **Iteration and Recursion:** How can students make use of structure and repeated processes to make use of structure and repeated processes to make use of ….
- **Cryptography:** How can students use mathematical tools strategically to create and analyze algorithms for encrypting information?
- **Counting:** How can students reason abstractly and quantitatively to attend to the sets of outcomes in counting situations, allowing them to maintain the meaning of quantities, not just how to compute them?

Further questions about DMPS?

Begin by contacting our project director, Dr. Osvaldo Soto (osoto@sdsu.edu). He will be happy to field questions.