

2021 Summer Bridge Outline

Summary

From the mathematical perspective, there are two primary goals of the Summer Bridge program:

1. Expose students to fun and exotic topics from mathematics, allowing them to get a preview of what various major tracks and areas of study might let them learn.
2. Prepare students to better understand and appreciate their upcoming calculus courses.

Each of the four weeks will carry a theme, and each will emphasize one of the above two goals. Weeks 1 and 4 will gently introduce fun and exotic topics, while weeks 2 and 3 will focus on motivating and introducing topics in calculus.

These topics will be accessible to all the students in the Bridge program, regardless of previous level of mathematical understanding. Instead of technical calculations and mysterious, complicated formulas, students should expect to see interesting puzzles and brilliant ideas that they may not have even thought had anything to do with math.

In large part, the students will also help guide the direction of the program. They will be given many opportunities to express which topics they find interesting, and how they feel about the difficulty levels of various topics. Students should also expect to interact a lot with each other, the Bridge program instructors, and the undergraduate mentors, allowing them to get helpful contacts and friends before even starting at UCLA. Whether it be through gaining interest in pursuing higher math, or simply feeling more confident going into calculus, each Summer Bridge student will be able to get something out of the program.

Program Details

Students will meet Mondays through Fridays, for 90 minutes per day. On Mondays, Wednesdays, and Fridays, students will meet with the Summer Bridge instructors. On Tuesdays and Thursdays, students will meet with the undergraduate student mentors.

Each instructor meeting will begin with a short review or introduction for the topic of the day. Afterwards, students will generally go into breakout rooms to work on questions and activities related to that day's topic. Instructors will go around to breakout rooms guiding the students as they work.

Each mentor meeting will focus on students getting to know each other and their undergraduate mentors. These mentors will be able to give them details about their own undergraduate experience, allowing the Bridge program students to get a better idea of what to expect.

Potential Topics

Many topics for the Bridge program will be decided based on student interest. All topics will be appropriately catered to an incoming college student, and will not assume prerequisite knowledge. Some tentative topics include:

- Graph Theory - How hard would it be to contact your long lost twin?
- Game Theory - Can you avoid LA traffic?
- Topology - How do you cut a bagel if you don't want to share?
- Fractals - Do you want to build a snowman...with infinite surface area?
- Gabriel's Horn - What's the world's worst paint job?
- Knot Theory - What's the best way to untangle headphones?
- Number Theory - Which planet has the best clocks?
- Functions - Do inputs and outputs get lonely?
- Infinities - Does Buzz Lightyear understand math?
- Sequences - Where do the dots in . . . go?
- Algorithms - Can robots know when they will die?
- Proofs - Can we ever stop asking why?
- Optimal Stopping - Who should you room with next year?
- Vector Fields - Can you comb the hair on a coconut without creating a cowlick?
- Differential Equations - How long do you have before your coffee cools?
- Binomial Series - Is there more to Pascal's triangle?