Mathematics

College Mission Statement

The mission of the College of Creative Studies (CCS) is to recruit the most talented and imaginative undergraduates, and provide them with the intellectual environment and advice that allows them to undergo the transition quickly from consumers of knowledge to colleagues in the act of human creativity in the arts and science.

Goals

- To pursue with vigor the identification and recruitment of students possessing productive and original minds from California and beyond.
- To enter each student into an intensive program of course work within an established major, tailored to his or her strengths, goals, and creative interest.
- To provide these students with consistent, individual assistance from committed staff and faculty as they develop their own sense of purpose and direction.
- To offer small classes where the students from different disciplines can interact and develop a sense of the breadth of creative endeavor, while also providing access to the full instructional, intellectual, and material resources of the research 1 University of California, Santa Barbara.
- To facilitate original work by students from the start of their freshman year under the direction of CCS faculty and faculty from various departments in the Colleges of Letters and Science and Engineering.
- To assure that all graduating CCS seniors will have completed a body of original work, be it in the form of paintings, musical compositions, original poetry or prose, or the reports of completed scientific or literary research.

CCS Math Program

The Math Program at the College of Creative Studies (CCS) provides a rigorous education in Mathematics to highly-motivated students. The small class sizes, the close student-faculty interaction, and the flexibility of the program create an environment in which students can develop high-level abilities in mathematics and become well-prepared for graduate work. The students are encouraged to take advantage of the many research opportunities available in the Mathematics Department as well as at other institutions through Summer Research Programs, and visits to other universities. The students also enjoy the freedom to create their own program of study based on their interests once they have fulfilled some basic requirements.

CCS Mathematics is a joint program between the College of Creative Studies and the Mathematics Department at The College of Letters and Science (L&S).

Program Objectives

The main goals of the Math Program at the College of Creative Studies are the following:

1. To identify individuals with special talents in mathematics.
2. To create a positive learning environment for highly-motivated and talented students.
3. To immerse students more deeply in mathematics than is usual in standard undergraduate programs.
4. To provide students with a flexible plan of study, giving them the opportunity to tailor an individualized program according to their interests.
5. To promote research among undergraduate students.
6. To encourage students to pursue graduate study.

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CCS Mathematics Major Requirements

Every CCS student is encouraged to create his or her own course program with the guidance of a faculty advisor. However, there are some standard requirements with which most students must comply.

General Education Requirements
Speak with the CCS staff adviser or your CCS faculty adviser and see the CCS GE Requirements document.

Required CCS Math Courses

Freshman Course Plan*
- Fall
    - Introduction to higher mathematics.
    - Linear Algebra
    - Problem-solving Seminar I.
- Winter
    - Advanced Linear Algebra
    - Introduction to Real Analysis
    - Problem-Solving Seminar II.
- Spring
    - Probability and Combinatorics
    - Introduction to Multidimensional Analysis: Differentiation.
    - Research seminar.

Sophomore Course Plan
- Second year courses
    - Introduction to Multidimensional Analysis: Integration.
    - Theory of Complex Variable (2 quarters)

Required L&S Upper-division Math Courses
- Real Analysis (Math 118A,B,C)
- Abstract Algebra (Math 111 A,B,C)

9 Upper-division Math courses of the Student's Choice
Classes may be undergraduate or graduate classes- Examples of undergraduate classes available are:

- Topology (Math 145A or Math 221A)
- Differential Geometry (Math 147 A,B)
- Number Theory (Math 115 A,B,C)
- Non-Euclidean Geometry (Math 113)
- Numerical Analysis (Math 104 A,B,C)
- Ordinary Differential Equations (Math 119A or Math 243)
- Chaotic Dynamics and Bifurcation Theory (Math 119B)
- Partial Differential Equations (Math 124A)
- Fourier Series and numerical methods (Math 124B)
- Applied Stochastic Processes (PSTAT 160 A)
- Combinatorial Analysis (Math 116)
- Graph and Network Theory (Math 137 A,B)

Courses in the Statistics Department:

- Probability and Statistics (Pstat 120BC)
- Statistical theory (Pstat 207ABC)
- Measure theory for probability (Pstat 210)
- Introduction to Probability Theory & Stochastic Processes (Pstat 160AB, Pstat 213ABC)

Senior Thesis - CCS students in the Mathematics Program will work aprox. 300 hours on a Senior Thesis. (This requirement is waived to those students who decide to pursue the Masters program)

Participation in Summer Research programs and a semester abroad are strongly encouraged.

*Preparation for the Major - If a student is invited to participate in the CCS program but have not had experience with mathematical proofs before, the student may be advised to take the classes 3CI, 5AI, and 5BI together with the Problem-Solving seminar the freshman year and postpone the rest of the CCS math courses to the sophomore year.