

# APPLIED MATHEMATICS | MATHEMATICS

## Major Map

*Solve real-world problems with  
the language of science.*

Mathematics is the language of science. The Bachelor of Arts degree programs in **Applied Mathematics** and **Mathematics** in the College of Letters & Science offer students the opportunity to learn the internal workings of this language, its central concepts and their interconnections. Students also learn to use mathematical concepts to formulate, analyze, and solve real-world problems. Their training in rigorous thought and creative problem-solving is valuable not just in science, but in all walks of life.

Mathematics at UC Berkeley is generally recognized as one of the most distinguished departments of mathematics in the world. The department has challenging honors-level undergraduate courses, hosts the **Putnam Mathematical Competition**, and sponsors undergraduate teams in the annual Mathematical Contest in Modeling.

## HIGHLIGHTS

- Work alongside a graduate student mentor in the **Directed Reading Program**.
- Participate in a **Research Experience for Undergraduates Summer Program**.
- Pursue a **senior honors thesis** in the department.

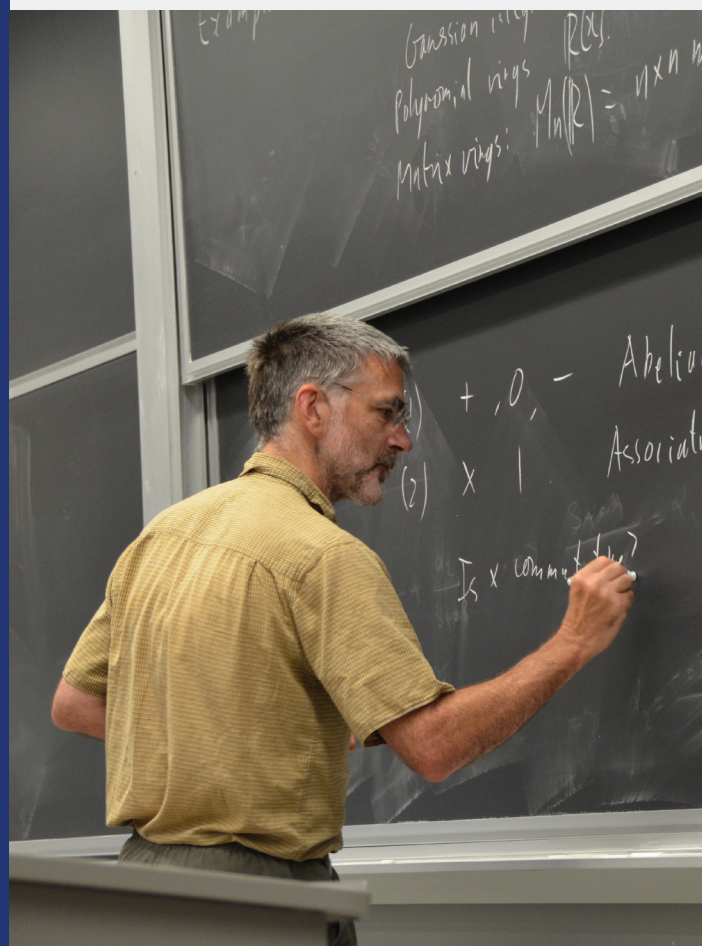


Photo credit: Ben Ailes

“

*The rigorous classes  
helped me think deeply  
about problem-solving  
and made me a more  
analytical thinker.*

”

—Applied Mathematics major

# UC Berkeley

# UNDERGRADUATE PROGRAM

*Applied Mathematics | Mathematics*

## CURRICULUM

The Applied Mathematics and Mathematics majors each require five lower division and eight upper division courses. Both majors require MATH 51 (formerly 1A), 52 (formerly 1B), 53, 54, and 55.

**Applied Mathematics** requires MATH 104, 110, 113, 128A, and 185, as well as three upper division (or graduate) elective courses to form a coherent **cluster in an applied area**. **Mathematics** requires MATH 104, 110, 113, and 185, as well as two upper division semi-electives and two upper division (or graduate) electives; a **teaching concentration** is optional. It should be emphasized that the character of mathematics changes sharply between lower and upper division courses. The role of computation diminishes and there is a greater emphasis on deductive reasoning. While some students find the theoretical approach more congenial, most find upper division courses more difficult.

*Learn more at [math.berkeley.edu/undergraduate](https://math.berkeley.edu/undergraduate)*

## ACADEMIC RESOURCES

- **MATH 1** Foundations of Lower Division Mathematics - brings students up-to-speed on fundamental concepts for MATH 10A/10B, 16A/16B, and 51/52.
- **MATH 74** Transition to Upper Division Mathematics - for students who are considering majoring in mathematics but wish additional training.
- **Student Learning Center** - offers tutoring and other services for Mathematics courses.
- **Tutoring** - The department maintains a list of undergraduates, graduate students, and alumni available for private tutoring in math at all levels.

## DECLARING THE MAJOR

Upon acceptance to UC Berkeley, you are admitted to the College of Letters & Science as an undeclared student. You are eligible to **declare the major** in Applied Mathematics or Mathematics once you have completed the following courses with a minimum grade of C in each course:

- MATH 51 and 52 (or equivalent)
- MATH 53, 54 or 56, and 55 (or equivalent); or completion of two of those three courses and currently enrolled in the third

If you have already completed upper division math courses, you must have a GPA of at least 2.0 from those courses at the time of declaration (note: upper division math coursework is not required to declare).



*Photo credit: Keegan Houser*

## WHAT CAN I DO WITH MY MAJOR?

Studying mathematics opens doors to a wide range of professional opportunities and career paths. The mathematics undergraduate program provides excellent preparation for advanced degrees in math, physical sciences, economics, and industrial engineering, as well as graduate study in business, education, law, and medicine. The program also prepares students for postbaccalaureate positions in business, technology, industry, teaching, government, and finance.

UC Berkeley offers a number of career resources for students studying Applied Mathematics. The College of Letters & Science hosts **MPS 101**, a career development course, and offers **advising** for undergraduates pursuing medical or health professions programs, law school, or masters and PhD programs. Additionally, **Berkeley Career Engagement** provides career and graduate school advising, job and internship listings, and events such as career and graduate school fairs.



### SPOTLIGHT

Robert, class of 2027

**When did you first know that you liked math?** It has always kind of come naturally to me. I find it really fun, and I know people are like, "Oh, my gosh, that's crazy of you."

**What is appealing about it?** In calculus, there are many ways to get to a certain answer. I like that there are different routes you can take. If you want to be difficult, you can take the difficult route, but there's always an easier way, too.

**When you think about applying math to your life in the future, what do you envision?** Hopefully with my career, I can do math. But like I said before, seeing different routes to get to the same place, I think you can apply that to real world problems.

## EMPLOYMENT

Alumni find employment in a variety of fields and industries after graduation. Examples include:

Actuarial Analyst  
AI Research Director  
Application Programmer  
Applications Engineer  
Business Analyst  
Data Scientist  
Energy Analyst  
Equity Trader  
Financial Consultant  
Investment Banking Analyst  
Quantitative Trader  
Research and Development Engineer  
Solutions Engineer  
Teacher  
Technical Consultant

## GRADUATE STUDY

Alumni pursue graduate education to gain more depth of knowledge in their field as well as prepare for jobs that require advanced degrees. Examples include:

Accounting  
Actuarial Science  
Applied Mathematics  
Biomedical Sciences  
Computer Science  
Economics  
Education  
Electrical Engineering  
Finance  
Mathematics  
Physics  
Statistics

# FOUR-YEAR STUDENT TIMELINE

*Applied Mathematics | Mathematics*

|                              | FIRST YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SECOND YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plan your studies            | <p>Start exploring with <b>L&amp;S 1</b> and the <b>L&amp;S New Freshman Student Guide</b>.</p> <p>Visit <b>L&amp;S Advising</b> for help with <b>major exploration</b> and <b>degree requirements</b>.</p> <p>Familiarize yourself with the <b>Applied Mathematics/Mathematics</b> major; meet with a <b>Math Peer Advisor</b>.</p> <p>Begin lower division requirements MATH 51 and 52 (enroll in MATH 1 to prepare).</p> <p>Join <b>Berkeley Connect</b> for 1:1 mentoring and to meet peers with shared interests.</p>                                        | <p>Complete MATH 53, 54, and 55; enroll in MATH 74 to prepare for upper division coursework.</p> <p>Meet with your <b>major</b> and <b>college advisor</b> to discuss your academic plans; plan your <b>major cluster</b> (Applied Math) or <b>teaching concentration</b> (Math).</p> <p>Look into <b>study abroad</b> and learning a <b>foreign language</b>; check out options for <b>Math abroad</b>.</p> <p>Interested in STEM teaching and learning? Enroll in <b>CalTeach</b>.</p> <p>Verify you have completed the major prerequisites and <b>declare the major</b>.</p> |
| Engage outside the classroom | <p>Get involved with a <b>student organization</b> such as <b>Mathematics Undergraduate Student Association</b> or <b>Gender Equity in Mathematics</b>.</p> <p>Access resources from <b>MPS Scholars</b> and the <b>Student Learning Center</b>.</p> <p>Visit <b>Berkeley Discovery</b> to get started with research, entrepreneurship, public service, and creative projects.</p> <p>Learn how to <b>prepare for office hours</b> and build relationships with faculty.</p> <p>Attend the <b>Undergraduate Research Fair</b> for Math and Physical Sciences.</p> | <p>Attend Math lectures, colloquiums, and other <b>department events</b>.</p> <p>Develop your skills in the <b>Berkeley Student Leadership Academy</b>.</p> <p>Explore research opportunities on the <b>OURS</b> and <b>Mathematics</b> websites; apply to <b>URAP</b> or <b>Bakar Ignite Scholars</b> to work on a faculty research project.</p> <p>Mentor local youth through <b>Bridging Berkeley, Expanding Your Horizons</b>, or <b>SENDforC</b>.</p> <p>Engage with math topics through the <b>Directed Reading Program</b>.</p>                                          |
| Pursue your career goals     | <p>Visit <b>UHS Career Counseling</b> and <b>Berkeley Career Engagement</b>.</p> <p>Start exploring <b>career paths</b> for Applied Mathematics majors; check out career resources on the <b>Mathematics</b> website.</p> <p>Begin <b>making a plan</b> to get career ready.</p> <p>Create or update your <b>resume</b> and <b>LinkedIn</b> profile.</p> <p>Start using <b>Handshake</b> to connect with career events and opportunities.</p>                                                                                                                     | <p>Meet with a BCE <b>career educator</b> to discuss career options and goals.</p> <p>Build your <b>network</b> and explore career fields via <b>job shadowing</b> and <b>informational interviews</b>.</p> <p>Pursue an <b>internship</b> to build skills and explore fields.</p> <p>Considering graduate school? Explore resources from the <b>Graduate Division</b>, <b>L&amp;S Advising</b>, and <b>BCE</b>; look into <b>UC LEADS</b> and the <b>Goldwater Scholarship</b>.</p>                                                                                            |

# UC Berkeley

## THIRD YEAR

Enroll in MATH 110 followed by other upper division requirements; take MATH 191 if planning to enter the **Putnam Competition**.

Review your **degree progress** with your major and college advisor.

Enrich your studies with a **certificate, course thread**, or minor such as **Science, Technology, and Society**.

Consider applying to the **Mathematics Honors Program**; look into the **Haas Scholars** and **SURF** programs.

Help other students as a **Mathematics Peer Advisor**.

Check out the **Public Service Internship, College Corps**, and **Haas Public Service Leaders Program**.

Get involved in public education with **Science at Cal** or the **Lawrence Hall of Science**.

Welcome new students to Berkeley as a **Golden Bear Orientation Leader**.

Challenge yourself by competing in the **Putnam Competition** or **Berkeley Math Tournament**.

Enroll in **MPS 101** Careers in the Mathematical and Physical Sciences.

Speak with faculty, advisors, and career educators about post-graduate options; look into the **Hertz Fellowship** and **NSF Graduate Research Fellowship**.

Join a professional association such as the **Mathematical Association of America**.

Interested in public service careers? Consider applying to the **John Gardner Fellowship, Huntington Award**, or **Truman Scholarship**.

## FOURTH YEAR

Enroll in MATH 104 and any remaining upper division requirements.

Complete electives for your major cluster (Applied Math) or semi-electives and electives (Math).

Join a thesis writing workshop at the **Student Learning Center**.

Challenge yourself with a graduate-level course.

Complete any remaining **degree requirements** and **prepare for graduation**.

Interested in teaching? Give it a try by teaching your own **DeCal course**.

Submit a course research project for the **Library Prize, American Cultures Student Prize**, or other awards.

Get published! Submit your thesis or research paper to the **Berkeley Scientific Journal**.

Pursue a special project after graduation with the **Stronach Prize**.

Check in with a BCE **career educator**.

Start connecting with **alumni groups** and **events**.

Apply to graduate school or post-graduate programs.

Meet employers at **info sessions, on-campus recruiting**, and **career fairs**.

Utilize **job search tools** from BCE and apply for job opportunities.

Learn about **alumni career services**.

## SUMMER

Take the Placement Exam for Freshman Mathematics before your first semester.

Make progress on degree requirements with a **Summer Sessions** course.

Engage in mentored research through the **National Science Foundation, SLMath**, or **Department of Energy**.

Go abroad through **Berkeley Study Abroad** or **UCEAP**.

Interested in science administration? Apply to the **NSF Summer Scholars Internship Program**.

Look into a summer internship with **Cal in the Capital, Cal in Sacramento**, or **Berkeley Global Internships**.

Pursue a **summer minor or certificate**—check out programs in **Data Science**.

Apply to the **GiGS program** to learn about graduate school.

*Use this major map to help plan your undergraduate experience, including academic and co-curricular opportunities. Activities in this map are suggestions—always consult with your advisors whenever possible.*

# TRANSFER STUDENT TIMELINE

Applied Mathematics | Mathematics

|                              | FIRST SEMESTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SECOND SEMESTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plan your studies            | <p>Get your bearings with <b>L&amp;S 198 Transitioning to Cal</b> and the <b>L&amp;S New Transfer Student Guide</b>.</p> <p>Meet with a <b>Math Peer Advisor</b> as well as your <b>major</b> and <b>college advisor</b>; plan your <b>major cluster</b> (Applied Math) or <b>teaching concentration</b> (Math).</p> <p>Begin upper division requirements with MATH 110; enroll in any needed lower division requirements.</p> <p>Join <b>Berkeley Connect</b> for 1:1 mentoring and to meet peers with shared interests.</p> <p>Verify you have completed the major prerequisites and <b>declare the major</b>.</p> | <p>Continue with upper division requirements; begin taking electives for your cluster (Applied Math) or semi-electives and electives (Mathematics).</p> <p>Look into <b>study abroad</b> and learning a <b>foreign language</b>; check out options for <b>Math abroad</b>.</p> <p>Consider applying to the <b>Mathematics Honors Program</b>; apply for support from <b>SURF</b> or the <b>Haas Scholars Program</b>.</p> <p>Interested in STEM teaching and learning? Enroll in <b>CalTeach</b>.</p>                                                                |
| Engage outside the classroom | <p>Get involved with a <b>student organization</b> such as <b>Mathematics Undergraduate Student Association</b> or <b>Gender Equity in Mathematics</b>.</p> <p>Visit <b>Berkeley Discovery</b> to get started with research, entrepreneurship, public service, and creative projects.</p> <p>Access resources from <b>MPS Scholars</b> and the <b>Student Learning Center</b>.</p> <p>Learn how to <b>prepare for office hours</b> and build relationships with faculty.</p> <p>Attend the <b>Undergraduate Research Fair</b> for Math and Physical Sciences.</p>                                                    | <p>Attend Math lectures, colloquiums, and other <b>department events</b>.</p> <p>Check out the <b>Public Service Internship, College Corps</b>, and <b>Haas Public Service Leaders Program</b>.</p> <p>Explore research opportunities on the <b>OURS</b> and <b>Mathematics</b> websites; apply to <b>URAP</b> or <b>Bakar Ignite Scholars</b> to work on a faculty research project.</p> <p>Mentor local youth through <b>Bridging Berkeley, Expanding Your Horizons</b>, or <b>SENDforC</b>.</p>                                                                   |
| Pursue your career goals     | <p>Visit <b>UHS Career Counseling</b> and <b>Berkeley Career Engagement</b>.</p> <p>Start exploring <b>career paths</b> for the major; check out career resources on the <b>Mathematics</b> website.</p> <p>Create or update your <b>resume</b> and <b>LinkedIn</b> profile.</p> <p>Use <b>Handshake</b> to start connecting with career events and opportunities.</p> <p>Meet with a BCE <b>career educator</b> to discuss career options and goals.</p>                                                                                                                                                            | <p>Build your <b>network</b> and explore career fields via <b>job shadowing</b> and <b>informational interviews</b>.</p> <p>Pursue an <b>internship</b> to build skills and explore fields.</p> <p>Considering graduate school? Explore resources from the <b>Graduate Division, L&amp;S Advising</b>, and <b>BCE</b>; look into <b>UC LEADS</b> and the <b>Goldwater Scholarship</b>.</p> <p>Speak with faculty, advisors, and career educators about post-graduate options; look into the <b>Hertz Fellowship</b> and <b>NSF Graduate Research Fellowship</b>.</p> |

# UC Berkeley

## THIRD SEMESTER

Keep taking upper division requirements and electives; take MATH 191 if planning to enter the **Putnam Competition**.

Review your **degree progress** with your major and college advisor.

Enrich your studies with a **certificate, course thread**, or minor such as **Science, Technology, and Society**.

Help other students as a **Mathematics Peer Advisor** or **Transfer Peer Advocate**.

Develop your skills in the **Berkeley Student Leadership Academy**.

Interested in teaching? Give it a try by teaching your own **DeCal course**.

Welcome new students to Berkeley as a **Golden Bear Orientation Leader**.

Challenge yourself by competing in the **Putnam Competition** or **Berkeley Math Tournament**.

Enroll in **MPS 101** Careers in the Mathematical and Physical Sciences.

Check in with a BCE **career educator**.

Join a professional association such as the **Mathematical Association of America**.

Interested in public service careers? Consider applying to the **John Gardner Fellowship**, **Huntington Award**, or **Truman Scholarship**.

Apply to graduate school or post-graduate programs.

## FOURTH SEMESTER

Complete MATH 104 if you haven't done so already.

Join a thesis writing workshop at the **Student Learning Center**.

Finish all upper division requirements and electives.

Challenge yourself with a graduate-level course.

Complete any remaining **degree requirements** and **prepare for graduation**.

Submit a course research project for the **Library Prize**, **American Cultures Student Prize**, or other awards.

Get involved in public education with **Science at Cal** or the **Lawrence Hall of Science**.

Get published! Submit your thesis or research paper to the **Berkeley Scientific Journal**.

Pursue a special project after graduation with the **Stronach Prize**.

Meet employers at **info sessions**, **on-campus recruiting**, and **career fairs**.

Utilize **job search tools** from BCE and apply for job opportunities.

Start connecting with **alumni groups** and **events**.

Learn about **alumni career services**.

## SUMMER

Get ready for Berkeley with **RHETOR 100 Writing at the University**.

Make progress on degree requirements with a **Summer Sessions** course.

Engage in mentored research through the **National Science Foundation**, **SLMath**, or **Department of Energy**.

Go abroad through **Berkeley Study Abroad** or **UCEAP**.

Interested in science administration? Apply to the **NSF Summer Scholars Internship Program**.

Look into a summer internship with **Cal in the Capital**, **Cal in Sacramento**, or **Berkeley Global Internships**.

Pursue a **summer minor or certificate**—check out programs in **Data Science**.

Apply to the **GiGS program** to learn about graduate school.

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# LEARN MORE

## *Undergraduate Advising*

*Have questions about Applied Mathematics and Mathematics, or choosing a major?*

The Department of Mathematics offers **undergraduate advising** for students interested in mathematics major and minor programs. Undergraduate Major Advisors advise on major requirements, department policies and procedures, campus resources, academic and professional opportunities, research opportunities, developing study plans, and more. Faculty Advisors counsel on the academic content of the undergraduate programs, advice on how to self-study in a specific mathematical area, and how to get involved in research opportunities. Peer Advisors provide guidance on how to navigate the department and university, and more. For advising contacts, visit [math.berkeley.edu](https://math.berkeley.edu).

The College of Letters & Science helps students with non-major-specific academic topics, including major exploration, general program planning, finding campus resources, and pre-professional graduate programs. L&S College Advisors are available for in-person and virtual meetings. Visit [lsadvising.berkeley.edu](https://lsadvising.berkeley.edu) or email [asklns@berkeley.edu](mailto:asklns@berkeley.edu).



Scan to explore more  
Major Maps!

[majormaps.berkeley.edu](https://majormaps.berkeley.edu)

## *Related Programs*

*Looking for programs similar to Applied Mathematics and Mathematics? UC Berkeley also offers the following major, minor, and certificate programs:*

- **Analytics**
- **Astrophysics**
- **Computer Science**
- **Economics**
- **Logic**
- **Physics**
- **Science and Math Education**
- **Statistics**



*Photo credit: Math Department*

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