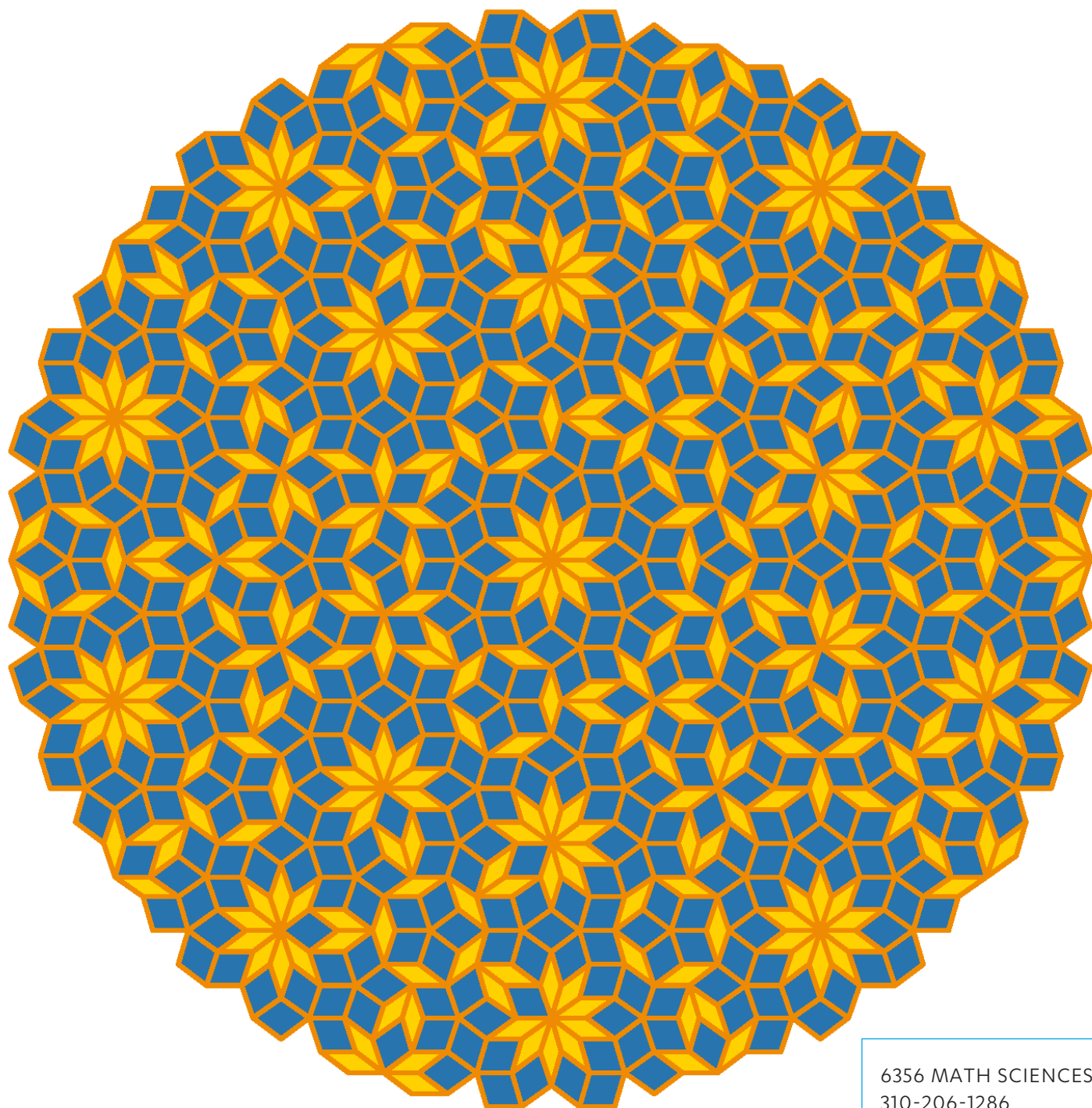


DEPARTMENT OF MATHEMATICS • 2019 – 2020

# UNDERGRADUATE HANDBOOK



6356 MATH SCIENCES  
310-206-1286  
[UGRAD@MATH.UCLA.EDU](mailto:UGRAD@MATH.UCLA.EDU)

## UNDERGRADUATE STUDENT SERVICES

### LOCATION

Math Sciences 6356

### PHONE

(310) 206-1286

### HOURS OF OPERATION

Monday–Friday  
7:30 a.m.–11:50 a.m.  
1 p.m.–4:30 p.m.

### WEBSITE

[www.math.ucla.edu/ugrad](http://www.math.ucla.edu/ugrad)

### DROP-IN ADVISING HOURS

No Appointment Necessary  
Monday–Friday  
9 a.m.–11 a.m.  
1 p.m.–4 p.m.

### ADVISORS

Yoni Anderson  
Vaneh Hartoonian  
Connie Jung

### MAILING ADDRESS

UCLA Department of Mathematics  
520 Portola Plaza  
Box #951555  
Los Angeles, CA 90095-1555

### MESSAGE CENTER

Accessible through MyUCLA  
[www.my.ucla.edu](http://www.my.ucla.edu)

### EMAIL

[ugrad@math.ucla.edu](mailto:ugrad@math.ucla.edu)

The student services office is available for drop-in advising every weekday. Enrollment issues are prioritized during weeks 0–2.

Advisors can help answer questions your regarding:

- Academic Difficulty
- Course Planning
- Career Planning
- Course Transfers
- Departmental Programs
- Enrollment Concerns
- Majors, Minors, and Specializations
- Student Organizations

## PROGRAMMING IN COMPUTING: PIC LAB

### LOCATION

Math Sciences 2000

### PHONE

(310) 825-7276

### WEBSITE

[www.pic.ucla.edu](http://www.pic.ucla.edu)

### HOURS: FALL, WINTER, SPRING

Monday, Wednesday, Friday  
9 a.m.–6 p.m.  
  
Tuesday, Thursday  
9 a.m.–9 p.m.  
  
Saturday  
CLOSED  
  
Sunday  
1 p.m.–5 p.m.

### HOURS: SUMMER SESSIONS

Monday–Friday  
10 a.m.–5 p.m.  
  
Saturday & Sunday  
CLOSED

The PIC Lab supports both PIC students learning programming and math students who wish to use analytical software. The lab is reserved for PIC and math students only.

Student accounts have 1 GB of disk space on the network drive and may print 200 pages per class per quarter at no charge. No additional printing is allowed.

Accounts are automatically created for all eligible students each quarter or can be requested at the Student Services Office.

Hours may vary each quarter. Visit the PIC Lab website for the current schedule. Reduced hours during finals week.

# FREQUENTLY ASKED QUESTIONS

## 1. Who should I go to regarding my GE or university requirements?

Questions regarding university or college requirements should be directed to the student's designated college counseling office: College of Letters and Science, Honors, AAP or Athletics. For more information, refer to their website.

[www.registrar.ucla.edu/Academics/Academic-Counseling](http://www.registrar.ucla.edu/Academics/Academic-Counseling)

## 2. Where can I obtain information about courses offered through other departments (non-Math/Programming In Computing courses)?

For questions regarding non-Math/PIC course syllabus, prerequisites, enrollment restrictions, transferability, etc., students should check with the department that offers the course. The mathematics department does not manage enrollment for courses outside of math and PIC.

## 3. Do I need to take the Math Diagnostic Test?

All students wishing to enroll in MATH 1, 3A, 31AL or 31A are required to take the math diagnostic test. The UCLA mathematics department requires students to use ALEKS PPL, a web-based learning system that uses adaptive technology to quickly and accurately assess readiness for certain mathematics courses. Each student who takes the diagnostic test through ALEKS PPL will be charged a \$20 non-refundable fee upon logging in, which covers six (6) months of access to the Prep and Learning Module.

Please contact the Student Services Office if you are not sure whether you need to take the exam.

[www.math.ucla.edu/ugrad/diagnostic](http://www.math.ucla.edu/ugrad/diagnostic)

## 4. Can I retake the Math Diagnostic Test?

Yes. Students are allowed three (3) attempts on the diagnostic exam. The first attempt establishes a baseline score to assess a student's knowledge of the topics. Students are allowed to retake the test two (2) times after establishing a baseline score. The most recent score, for better or worse, will be placed into the student's record. Students can register for a new ALEKS assessment each quarter prior to enrollment.

If you are satisfied with your placement based on the baseline score, you do not need to take the test again. If you did not receive a baseline score that places you in your desired class, you can attempt to retake the test after a 48-hour cooling period and after doing a minimum of three (3) hours of self-review in the learning modules.

Even if you are satisfied with the initial score, you are highly encouraged to review the learning modules and achieve up to 80% mastery in each topic to help you prepare for the course.

## 5. If I took an AP Calculus exam, what math course should I enroll in at UCLA?

Only students that receive a score of 3, 4 or 5 on the AP Calculus AB or BC exams will receive college credit. Credit may vary depending on your major and the college to which you belong. Math majors will receive the credit as indicated in the following chart:

| Score | AB Exam                                      | BC Exam  |
|-------|--|--|
| 5     | Credit for MATH 31A<br>Enroll in MATH 31B/3B | Credit for MATH 31A, 31B<br>Enroll in MATH 32A/3C                    |
| 4     | Credit for 4 units of calculus               | Credit for MATH 31A and 4 units of calculus<br>Enroll in MATH 31B/3B |
| 3     | Credit for 4 units of calculus               | Credit for 8 units of calculus                                       |
| 2     | No college credit                            | No college credit  |
| 1     | No college credit                            | No college credit  |

## 6. What credit will I receive with my International Baccalaureate (IB) Higher Level Exam?

UCLA awards college credit for higher level (HL) exams only. Credit awarded by UCLA as a result of IB exams is subject to change without notice. IB examinations, AP examinations, and college courses taken prior to or after enrolling at UCLA may be duplicative. In these cases, students will be awarded credit for only one course.

To receive credit for math equivalences, the IB exams must be passed with a score of 6 or 7. Students may petition for more advanced credit if they will be taking more advanced math at UCLA (MATH 31B and further).

[www.admission.ucla.edu/prospect/ibcredits.htm](http://www.admission.ucla.edu/prospect/ibcredits.htm)

[www.admission.ucla.edu](http://www.admission.ucla.edu)

### POSSIBLE UCLA COURSE CREDIT FOR IB EXAMS

| IB EXAM                | SCORE      | CREDIT                            |
|------------------------|------------|-----------------------------------|
| Mathematics HL         | 6 or 7     | MATH 31A and credit for 4.0 units |
| Further Mathematics HL | 5, 6, or 7 | Credit for 8.0 units of calculus  |

# FREQUENTLY ASKED QUESTIONS

## 7. Does my Advanced Level General Certificate of Education, commonly referred to as an A-Level exam, count for anything?

Credit awarded by UCLA as a result of A-Level exams is subject to change without notice. In order to receive credit for math equivalences, the A-Level exams must be passed with “C” grades or better. Math majors will receive the credit as indicated in the following chart:

### POSSIBLE UCLA COURSE CREDIT FOR CIE A-LEVEL EXAMS

|  | A                   | B                   | C      |
|--|---------------------|---------------------|--------|
| Pure Mathematics 1 (P1) +<br>Pure Mathematics 3 (P3) +<br>Mechanics 1 (M1) +<br>Probability and Statistics 1 (S1)                  | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1 |
| Pure Mathematics 1 (P1) +<br>Pure Mathematics 3 (P3) +<br>Mechanics 1 (M1) +<br>Mechanics 2 (M2)                                   | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1 |
| Pure Mathematics 1 (P1) +<br>Pure Mathematics 3 (P3) +<br>Probability and Statistics 1 (S1) +<br>Probability and Statistics 2 (S2) | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1 |

### POSSIBLE UCLA COURSE CREDIT FOR SINGAPORE A-LEVEL EXAMS

|                                   | A                   | B                   | C      |
|-----------------------------------|---------------------|---------------------|--------|
| Higher 2 Mathematics: (P1) + (P2) | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1 |

### POSSIBLE UCLA COURSE CREDIT FOR EDEXCEL A-LEVEL EXAMS

|   | A                   | B                   | C                   |
|---|---------------------|---------------------|---------------------|
| GCE Mathematics (9371):<br>C1, C2, C3, C4           | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1              |
| GCE Further Mathematics (9372):<br>FP1 and FP2      | 12.0 title<br>units | 12.0 title<br>units | 12.0 title<br>units |
| GCE Further Mathematics (9372):<br>FP1 and FP3      | 12.0 title<br>units | 12.0 title<br>units | 12.0 title<br>units |
| GCE Pure Mathematics (9373):<br>C1, C2, C3, C4, FP1 | MATH 1,<br>MATH 31A | MATH 1,<br>MATH 31A | MATH 1              |

CIE A-Level Mathematics (9709) — <http://www.cambridgeinternational.org/programmes-and-qualifications/cambridge-international-as-and-a-level-mathematics-9709/>

CIE A-Level Mathematics - Further (9231) — <http://www.cambridgeinternational.org/programmes-and-qualifications/cambridge-international-as-and-a-level-mathematics-further-9231/>

Singapore A-Level — <https://www.seab.gov.sg/home/examinations/gce-a-level>

Edexcel A-Level — <https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.html>

Credit may vary depending on your major and the college to which you belong. Consult with the Undergraduate Admission Office for more information.

[www.admission.ucla.edu](http://www.admission.ucla.edu)

## 8. What is a typical course load for math students?

All math majors should be taking at least one math class per quarter for the first two years. By their junior year, students should be taking two to three major courses per quarter. These are just recommendations. Schedules and course load will vary depending on students’ interests and level.

## 9. How big are the math classes?

Lower division classes usually have a capacity of 210 students per lecture (35 students per discussion). Upper division classes usually have a capacity of 40 students in each lecture.

## 10. What if a math course I planned to take is full during my enrollment appointment?

If there are open sections of that course offered at a different time, it is best to try to rearrange your schedule and enroll in the open section. Otherwise, you should add yourself to the waitlist. If both the course and waitlist are full, you can continue to check the enrollment numbers on the Schedule of Classes and try to add yourself to the waitlist if space becomes available.

Upper division math courses are restricted to math majors and minors only during the first pass. Students in a math pre-major are not able to enroll in upper division math courses during first pass. Enrollment is open to all students during second pass, with a few exceptions in certain specialized courses.

For upper division math courses only, you can place your name on the unofficial waitlist, which opens on the first day of class. Signing up for the unofficial waitlist does not guarantee that you will be enrolled in the class. The Mathematics Department reviews all unofficial waitlist requests. Students will be given the opportunity to enroll when the class enrollment falls below its maximum based on priority.

If you are not enrolled in the class by the first day of instruction, you can stop by MS 6356 or email [ugrad@math.ucla.edu](mailto:ugrad@math.ucla.edu) for more information. It is always a good idea to have a back-up plan, as enrollment in any course is not guaranteed and you may have to take the course the next time it is offered.

[sa.ucla.edu/ro/public/soc](http://sa.ucla.edu/ro/public/soc)  
[www.math.ucla.edu/ugrad/unofficial-waitlist](http://www.math.ucla.edu/ugrad/unofficial-waitlist)

## 11. Can I take a “Preparation for the Major” or “Major” course pass/no pass?

No. All required courses for the major, minor, or specialization must be at least 4.0 units and taken for a letter grade.

## 12. If I received a “C-” or lower in my math class, may I repeat it?

For lower division mathematics courses, students may not take or repeat a course for credit if it is a requisite for a more advanced lower division course for which they already have credit. This applies in particular to the repetition of courses (e.g., if students wish to repeat MATH 31B, they must do so before completing MATH 32B; if students wish to repeat MATH 3B or 31B or 32A, they must do so before completing MATH 33A).

For upper division mathematics courses, students may not take or repeat a lower sequence course for credit if it is part of a sequence for which they already have credit. This applies in particular to the repetition of courses (e.g., if students wish to repeat MATH 131A, they must do so before completing MATH 131B or 131BH).

Students may not receive credit for both a course and the honors version of that course (e.g., they may not receive credit for both MATH 131A and 131AH).

Refer to the College of Letters and Science website for more policy information about repeating courses.

[www.cac.ucla.edu/academic-policies/grading-repeats](http://www.cac.ucla.edu/academic-policies/grading-repeats)

# FREQUENTLY ASKED QUESTIONS

## 13. How and when may I drop a course?

Refer to the drop deadline chart for deadlines and fees.

If you are on financial aid and plan to drop a course, you should also speak with the Financial Aid Office to learn more about how dropping courses impacts your financial aid.

[www.financialaid.ucla.edu](http://www.financialaid.ucla.edu)

International students should visit the Dashew Center before dropping below 12.0 units.

[www.internationalcenter.ucla.edu](http://www.internationalcenter.ucla.edu)

## UNDERGRADUATE DROP DEADLINES AND FEES

COLLEGE OF LETTERS AND SCIENCE

| DROP PERIOD                           | TYPE                | METHOD    | FEE  | TRANSCRIPT NOTATION |
|---------------------------------------|---------------------|-----------|------|---------------------|
| Weeks 1-2<br>All Courses              | Drop                | MyUCLA    | None | No notation         |
| Weeks 3-4<br>Non-impacted<br>Courses  | Drop                | MyUCLA    | \$5  | No notation         |
| Weeks 3-10<br>Impacted<br>Courses     | Late Drop           | Petition* | \$20 | Transcript Notation |
| Weeks 5-7<br>Non-impacted<br>Courses  | Late Drop           | MyUCLA    | \$20 | Transcript Notation |
| Weeks 8-10<br>Non-impacted<br>Courses | Restricted<br>Drop  | Petition* | \$35 | Transcript Notation |
| After week 10                         | Retroactive<br>Drop | Petition* | \$50 | Transcript Notation |

\*Petitions are available in Murphy Hall A-316

## 14. How can I find a tutor?

The Student Math Center in MS 3974 offers individual and group homework assistance for lower division math courses.

[www.math.ucla.edu/ugrad/smc](http://www.math.ucla.edu/ugrad/smc)

The Academic Advancement Program (AAP) in Campbell Hall 1232 offers free tutoring for lower division math and sciences courses to students whose academic profiles and personal backgrounds may impact their university experience, their retention and graduation from UCLA.

[www.aap.ucla.edu](http://www.aap.ucla.edu)

Engineering and Mathematical Sciences Library (EMS) in Boelter Hall 8270 offers various academic resources to current UCLA students.

[www.library.ucla.edu/sel](http://www.library.ucla.edu/sel)

Private (fee based) tutoring is available from graduate students in the mathematics department. Refer to our website for a list of available tutors. For rates, please contact the tutors directly.

[www.math.ucla.edu/people/tutors](http://www.math.ucla.edu/people/tutors)

More tutoring resources can be viewed on our website at:

[www.math.ucla.edu/ugrad/tutoring](http://www.math.ucla.edu/ugrad/tutoring)

## 15. Can I take courses for my major at another school?

Yes. If you would like to complete some "Preparation for the Major" or "Major" courses during the summer at a community college, four-year university, or at another UC campus, you must verify course equivalences with an undergraduate math advisor prior to completing the course. Also, please check with your college counselor regarding residency requirements and other regulations for taking courses at another school.

Upon completion of the course(s), send an official transcript to UCLA Undergraduate Admission. You must also fill out a Transfer Credit Evaluation Request form in order to have the course evaluated and credited to your record.

[www.admission.ucla.edu/trcredit.htm](http://www.admission.ucla.edu/trcredit.htm)

## 16. Will the grade for a course taken at another institution transfer to UCLA?

While credit for courses taken at other schools may be used for satisfying pre-major and major requirements, the grades themselves are transferred to your UCLA transcript only if the course is taken at another UC campus or through Education Abroad Program (EAP). However, grades taken at UC Extension programs do not transfer, except for those earned in Concurrent Enrollment (XLC) classes at UCLA Extension.

## 17. If I want to study abroad, how can I find out if the math courses I plan to take will count towards my major?

Students should consult with the undergraduate math advisor only after they have met with EAP and know which math courses they are considering. Bring program information, course descriptions and outlines when you meet with the undergraduate math advisor.

[ieo.ucla.edu/uceap](http://ieo.ucla.edu/uceap)

## 18. Where and when may I petition to change or declare my major?

Visit the Student Services office in MS 6356 to submit a program change petition form.

Students can apply for any of the pre-majors as long as they are in good academic standing and will not go over their unit max if they are accepted into the major.

Students can petition to be in any math major as long as they meet the minimum requirements to enter the major, have not exceeded 160.0 units (not including AP UNITS), complete the mathematics sequenced courses with "C's" or better, have a GPA of 2.5 (2.7 for Math/Econ, 3.3 for Data Theory) or higher, and have no more than two repeats.

Additionally, students should meet the following criteria at the time of application: 1.) Completed one 12.0 unit term in residence during a regular academic session at UCLA; 2.) Enrolled at UCLA during a regular academic session; and 3.) GPA of 2.0 or above in upper division courses taken for the major.

Additional economics preparation courses are required for the Mathematics/Economics and the Financial Actuarial Mathematics major where students can only have one repeat. Please refer to the department's website for more information on requirements.

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

[www.math.ucla.edu/ugrad/majors](http://www.math.ucla.edu/ugrad/majors)

## FREQUENTLY ASKED QUESTIONS

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### 19. Can I double major?

The university requires students who want to double major to complete all the preparation for the major in both majors and two upper division courses in each major before applying. Please start by meeting with an undergraduate math advisor in MS 6356. If you are looking to switch to a different major outside of the mathematics department, please consult with the advisor for that specific department.

### 20. Can I declare more than one type of math major?

No. Additionally, students cannot declare a math major and math minor, or Mathematics/Economics and any economics major.

### 21. How do I add the Specialization in Computing?

If you are in any math major (except Mathematics of Computation), you can submit a petition to MS 6356 upon completion of PIC 10B with a grade of "C-" or better. If at any time you wish to drop the specialization, you must submit a petition requesting that it be removed.

### 22. What other major or minor options are available if I decide to not be a math major?

There is one interdepartmental program with the mathematics department that is run by another department:

- **Computational and Systems Biology**  
Life Sciences Division  
[www.casb.ucla.edu](http://www.casb.ucla.edu)

There are two minors in the Mathematics Department:

- **Minor in Mathematics**
- **Minor in Mathematics for Teaching**

### 23. What is the difference between a Mathematics/Economics and an Economics or Business Economics major?

Mathematics/Economics students receive a Bachelor of Science degree and are under the Mathematics Department major requirements. Over half of the required major courses for the Mathematics/ Economics degree are in mathematics and about half are in economics. The program is designed to give students a solid foundation in both mathematics and economics, stressing those areas of mathematics that are most relevant to economics and the parts of economics that emphasize the use of advanced mathematics.

## CREDIT LIMITATIONS

**Credit is given for only one course in each of the following groups:**

- MATH 3A, 31A, 31AL
- MATH 3B, 31B
- MATH #, #H
- MATH 110A, 117
- MATH 170A, 170E
- MATH 174A, 174E

You may not take a mathematics course for credit if you have credit for a more advanced course that lists the first course as a prerequisite. This applies in particular to the repetition of courses.

For example, if you wish to repeat MATH 31B, you must do so before completing MATH 32B. However, you are allowed to repeat MATH 31B after completing MATH 32A, since MATH 31B is not a prerequisite for MATH 32A.

You may not receive credit for both a course and for the honors version of the course (e.g., you may not receive credit for both MATH 131A and 131AH). MATH 110A, 110B and MATH 110AH, 110BH (Honors) are a special case. Please see an undergraduate advisor in the Mathematics Department if you find that you have stopped in the middle of one of the algebra sequences and want to finish with the other the following year.

## USING NON-MATH COURSES TO FULFILL MATH MAJOR REQUIREMENTS

Unless there are course credit restrictions stated, students are welcome to take the related courses offered by other departments. This includes, but is not limited to: Algorithms, Data Analysis/Mining, Financial Mathematics, Game Theory, Machine Learning, Networks, and Probability/Statistics.

Although the topics may be similar, the material in the course offered by the other department will be taught with different approaches and through the lens of that discipline. However, the Mathematics Department will limit students to applying only one unique topic to their major requirements.

For example, a student can take both MATH 167 and ECON 106G for credit, but only one game theory course can be used to complete the major requirement. Credit for non-math courses will not be automatically applied towards the mathematics major requirements. Students must file a petition with the Mathematics Department to receive credit.

The Mathematics Department is not endorsing enrollment in non-math courses to fulfill major requirements. If you are interested in taking a course offered by a different department, you may be held to any enrollment restrictions enforced by the department that offers the course.

**You may not receive credit for:**

**If you have already taken:**

|  |   |
|--|---|
| MATH 2: Finite Mathematics   | Any MATH #106-199   |
| MATH 32T: Essential Calculus for Mathematical Biologists   | Any MATH 30's course  |
| MATH 132: Complex Analysis for Applications  | PHYSICS 132: Mathematical Methods of Physics  |
| MATH 151A: Applied Numerical Methods   | EC ENGR 133A: Applied Numerical Computing   |
| MATH 156: Machine Learning   | EC ENGR M146: Introduction to Machine Learning  |
| MATH 167: Mathematical Game Theory   | ECON 106G: Introduction to Game Theory  |
| MATH 170A: Probability Theory or<br>MATH 170E: Introduction to Probability and Statistics 1: Probability | STATS 100A: Introduction to Probability Theory<br>or EC ENGR 131A: Probability and Statistics                 |
| MATH 170S: Introduction to Probability and Statistics 2: Statistics                                      | STATS 100B: Introduction to Mathematical Statistics   |
| MATH 174E: Mathematics of Finance  | ECON 141: Topics in Microeconomics: Mathematical Finance or<br>STATS C183/C283: Statistical Models in Finance |
| MATH 180: Graph Theory   | EC ENGR 134: Graph Theory in Engineering  |
| MATH 182: Algorithms   | COM SCI 180: Introduction to Algorithms and Complexity  |
| PIC 10A: Introduction to Programming   | COM SCI 31: Introduction to Computer Science I  |

## MAJORS IN MATHEMATICS

### MATHEMATICS

Pure Mathematics

Designed for students who are interested in the theory of mathematics. Pure mathematicians often pursue a master and doctorate degree in mathematics in order to prepare for a career in research or university level teaching.

### APPLIED MATHEMATICS

Designed for students who are interested in the classical relationships between the physical sciences and engineering. They often seek employment in the industry utilizing their skills to solve engineering and computer related problems.

### DATA THEORY

Trains students, through theory and practice, in the mathematical, statistical, and computational principles of data science. Top graduates will be prepared for graduate studies in a field related to data science or an initial technical position in the field with leadership potential. In collaboration with Statistics, it is a capstone major with a data-based project in the senior year.

### FINANCIAL ACTUARIAL MATHEMATICS

Designed for students interested in financial mathematics and its applications. Graduates typically go on to MFE/MBA programs, the actuarial field, banking and/or business.

### MATHEMATICS OF COMPUTATION

Designed for individuals who are interested in the mathematical theory and the applications of computing. These students often seek employment in areas similar to the applied mathematicians.

### MATHEMATICS FOR TEACHING

Designed for students who have a substantial interest in teaching mathematics at the secondary level. Visit the Curtis Center website for more information about other undergraduate teacher preparation programs such as the Joint Mathematics Education Program and the Subject Matter Preparation Program at <https://curtiscenter.math.ucla.edu/>

### MATHEMATICS/APPLIED SCIENCE

3 Available Plans

**History of Science** — For students intending to go to professional school, law or business, while pursuing their interest in mathematics.

**Medical and Life Sciences** — Prepares students for a career in the medical field while pursuing their interest in mathematics. Several courses overlap with the pre-med requirements.

**Individual** — Allows students to combine upper division math with upper division courses from other science areas (i.e., physics, chemistry, physiology, etc.). This major requires departmental approval and is rarely granted because the Department already offers a wide range of majors.

### MATHEMATICS/ECONOMICS

Designed to give students a solid foundation in both mathematics and economics, stressing those areas of mathematics and statistics that are most relevant to economics and the parts of economics that emphasize the use of mathematics and statistics. It is ideal for students who may wish to complete a higher degree in economics.

## MINORS AND SPECIALIZATIONS

### MINOR IN MATHEMATICS

Designed to provide students who are non-math major the opportunity to widen their background and general comprehension of the role of mathematics in various disciplines.

### MINOR IN MATHEMATICS FOR TEACHING

Designed for students majoring in fields other than mathematics who plan to teach secondary mathematics after graduation.

### SPECIALIZATION IN COMPUTING

A specialization requires a sequence of supplemental courses that enhance work in a specific major. Different from a minor, it provides extensive education in programming and its applications in the field of mathematics. The Department of Mathematics offers a Specialization in Computing, which can be added to all of the math majors with the exception of Mathematics of Computation.

## INTERDEPARTMENTAL MAJORS

### COMPUTATIONAL AND SYSTEMS BIOLOGY

Visit the Computational and Systems Biology (CaSB) office or website for more information — Hershey Hall 102 • [www.casb.ucla.edu](http://www.casb.ucla.edu)



# MATHEMATICS B.S.

## PRE-MAJOR: 10 COURSES

Students can declare the pre-major at any time while in good academic standing.

Two courses from the following:

|            | Quarter | Grade |                         | Quarter | Grade |
|------------|---------|-------|-------------------------|---------|-------|
| MATH 31A*  | _____   | _____ | ECON 11                 | _____   | _____ |
| MATH 31B*  | _____   | _____ | CHEM 20A                | _____   | _____ |
| MATH 32A*  | _____   | _____ | CHEM 20B                | _____   | _____ |
| MATH 32B*  | _____   | _____ | LIFESCI 7A              | _____   | _____ |
| MATH 33A*  | _____   | _____ | PHYSICS 1B <b>or</b> 5B | _____   | _____ |
| MATH 33B*  | _____   | _____ | PHYSICS 1C <b>or</b> 5C | _____   | _____ |
| PIC 10A    | _____   | _____ | PHILOS 31               | _____   | _____ |
| PHYSICS 1A | _____   | _____ | PHILOS 132              | _____   | _____ |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 12 COURSES

Students must declare the major before reaching 160 units (not including AP units).

Five upper division mathematics courses chosen from:  
MATH 106–199, STATS 100A–102C

|                        | Quarter | Grade |    | Quarter | Grade |
|------------------------|---------|-------|----|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | 1. | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | 2. | _____   | _____ |
| MATH 110A              | _____   | _____ | 3. | _____   | _____ |
| MATH 110B              | _____   | _____ | 4. | _____   | _____ |
| MATH 120A              | _____   | _____ | 5. | _____   | _____ |
| MATH 131B              | _____   | _____ |    |         |       |
| MATH 132               | _____   | _____ |    |         |       |

<sup>+</sup>Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

Two courses from the following:

|                       | Quarter | Grade |                         | Quarter | Grade |
|-----------------------|---------|-------|-------------------------|---------|-------|
| MATH 31A*             | _____   | _____ | ECON 11                 | _____   | _____ |
| MATH 31B*             | _____   | _____ | CHEM 20A                | _____   | _____ |
| MATH 32A*             | _____   | _____ | CHEM 20B                | _____   | _____ |
| MATH 32B*             | _____   | _____ | LIFESCI 7A              | _____   | _____ |
| MATH 33A*             | _____   | _____ | PHYSICS 1B <b>or</b> 5B | _____   | _____ |
| MATH 33B*             | _____   | _____ | PHYSICS 1C <b>or</b> 5C | _____   | _____ |
| MATH 11 <b>or</b> 61* | _____   | _____ | PHILOS 31               | _____   | _____ |
| PIC 10A               | _____   | _____ | PHILOS 132              | _____   | _____ |
| PHYSICS 1A            | _____   | _____ |                         |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 12 COURSES

Students must declare the major before reaching 160 units (not including AP units).

Five upper division mathematics courses chosen from:  
MATH 106–199, STATS 100A–102C

|                        | Quarter | Grade |    | Quarter | Grade |
|------------------------|---------|-------|----|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | 1. | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | 2. | _____   | _____ |
| MATH 110A              | _____   | _____ | 3. | _____   | _____ |
| MATH 110B              | _____   | _____ | 4. | _____   | _____ |
| MATH 120A              | _____   | _____ | 5. | _____   | _____ |
| MATH 131B              | _____   | _____ |    |         |       |
| MATH 132               | _____   | _____ |    |         |       |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# APPLIED MATHEMATICS B.S.

## PRE-MAJOR: 10 COURSES

Students can declare the pre-major at any time while in good academic standing.

One course from the following:

|            | Quarter | Grade |            | Quarter | Grade |
|------------|---------|-------|------------|---------|-------|
| MATH 31A*  | _____   | _____ | CHEM 20A   | _____   | _____ |
| MATH 31B*  | _____   | _____ | CHEM 20B   | _____   | _____ |
| MATH 32A*  | _____   | _____ | PHYSICS 1C | _____   | _____ |
| MATH 32B*  | _____   | _____ |            |         |       |
| MATH 33A*  | _____   | _____ |            |         |       |
| MATH 33B*  | _____   | _____ |            |         |       |
| PIC 10A    | _____   | _____ |            |         |       |
| PHYSICS 1A | _____   | _____ |            |         |       |
| PHYSICS 1B | _____   | _____ |            |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major

## THE MAJOR: 12 COURSES

Students must declare the major before reaching 160 units (not including AP units).

Two 2-quarter sequences chosen from three different categories:

|  | Quarter | Grade |                                      | Quarter | Grade |
|--|---------|-------|--------------------------------------|---------|-------|
| MATH 115A <sup>+</sup>   | _____   | _____ | <b>A. Differential Equations</b>     |         |       |
| MATH 131A <sup>+</sup>   | _____   | _____ | MATH 134                             | _____   | _____ |
| MATH 131B  |         |       | MATH 135                             | _____   | _____ |
| <b>or</b> MATH 132   | _____   | _____ | <b>B. Applied Numerical Methods</b>  |         |       |
| MATH 142   | _____   | _____ | MATH 151A                            | _____   | _____ |
|  |         |       | MATH 151B                            | _____   | _____ |
| <b>Four</b> upper division mathematics courses chosen from:<br>MATH 106–199, STATS 100A–102C |         |       | <b>C. Probability and Statistics</b> |         |       |
| 1. _____   | _____   | _____ | MATH 170E                            | _____   | _____ |
| 2. _____   | _____   | _____ | MATH 170S                            | _____   | _____ |
| 3. _____   | _____   | _____ | <b>or</b>                            |         |       |
| 4. _____   | _____   | _____ | STATS 100A                           | _____   | _____ |
|  |         |       | STATS 100B                           | _____   | _____ |
|  |         |       | <b>or</b>                            |         |       |
|  |         |       | MATH 170A                            | _____   | _____ |
|  |         |       | MATH 170B                            | _____   | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# APPLIED MATHEMATICS B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                       |         | One course from the following: |            |         |       |
|-----------------------|---------|--------------------------------|------------|---------|-------|
|                       | Quarter | Grade                          |            | Quarter | Grade |
| MATH 31A*             | _____   | _____                          | CHEM 20A   | _____   | _____ |
| MATH 31B*             | _____   | _____                          | CHEM 20B   | _____   | _____ |
| MATH 32A*             | _____   | _____                          | PHYSICS 1C | _____   | _____ |
| MATH 32B*             | _____   | _____                          |            |         |       |
| MATH 33A*             | _____   | _____                          |            |         |       |
| MATH 33B*             | _____   | _____                          |            |         |       |
| MATH 11 <b>or</b> 61* | _____   | _____                          |            |         |       |
| PIC 10A               | _____   | _____                          |            |         |       |
| PHYSICS 1A            | _____   | _____                          |            |         |       |
| PHYSICS 1B            | _____   | _____                          |            |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major

## THE MAJOR: 12 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|  |         | Two 2-quarter sequences chosen from three different categories: |                                      |         |       |
|--|---------|---|--------------------------------------|---------|-------|
|  | Quarter | Grade   |                                      | Quarter | Grade |
| MATH 115A <sup>+</sup>   | _____   | _____   | <b>A. Differential Equations</b>     |         |       |
| MATH 131A <sup>+</sup>   | _____   | _____   | MATH 134                             | _____   | _____ |
| MATH 131B  | _____   | _____   | MATH 135                             | _____   | _____ |
| <b>or</b> MATH 132   | _____   | _____   | <b>B. Applied Numerical Methods</b>  |         |       |
| MATH 142   | _____   | _____   | MATH 151A                            | _____   | _____ |
|  |         |   | MATH 151B                            | _____   | _____ |
| <b>Four</b> upper division mathematics courses chosen from:<br>MATH 106–199, STATS 100A–102C |         |   | <b>C. Probability and Statistics</b> |         |       |
| 1. _____   | _____   | _____   | MATH 170E                            | _____   | _____ |
| 2. _____   | _____   | _____   | MATH 170S                            | _____   | _____ |
| 3. _____   | _____   | _____   | <b>or</b>                            |         |       |
| 4. _____   | _____   | _____   | STATS 100A                           | _____   | _____ |
|  |         |   | STATS 100B                           | _____   | _____ |
|  |         |   | <b>or</b>                            |         |       |
|  |         |   | MATH 170A                            | _____   | _____ |
|  |         |   | MATH 170B                            | _____   | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# DATA THEORY B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|            | Quarter | Grade |   | Quarter   | Grade |       |
|------------|---------|-------|---|-----------|-------|-------|
| MATH 31A*  | _____   | _____ | <b>One</b> course from the following: STATS 10-15 |           |       |       |
| MATH 31B*  | _____   | _____ |   | 1. _____  | _____ | _____ |
| MATH 32A*  | _____   | _____ |   | STATS 20* | _____ | _____ |
| MATH 32B*  | _____   | _____ |   | STATS 21* | _____ | _____ |
| MATH 33A*  | _____   | _____ |   | PIC 10A*  | _____ | _____ |
| MATH 42*   | _____   | _____ |   |           |       |       |
| MATH 115A* | _____   | _____ |   |           |       |       |

\*All preparation courses must be completed with a minimum overall **3.3** grade-point average and a grade of “C” or better in each course by the end of fall quarter of Year 3. Repetition of more than two courses more than once, results in automatic dismissal from the major.

## THE MAJOR: 16 COURSES

Students must declare the major before reaching 160 units (not including AP units). *Other restrictions apply, please see the General Catalog for more information.*

|   | Quarter | Grade |   | Quarter  | Grade |
|---|---------|-------|---|----------|-------|
| MATH 131A <sup>+</sup>                                      | _____   | _____ | STATS 101A  | _____    | _____ |
| MATH 118  | _____   | _____ | STATS 101C  | _____    | _____ |
| MATH 156  | _____   | _____ | STATS 102A  | _____    | _____ |
|   |         |       | STATS 102B  | _____    | _____ |
|   |         |       | STATS 147   | _____    | _____ |
|   |         |       | STATS 184   | _____    | _____ |
| <b>One</b> 2-quarter sequence of Probability and Statistics |         |       |   |          |       |
| <b>A. Intro to Probability and Statistics</b>               |         |       |   |          |       |
| MATH 170E   | _____   | _____ | <b>One</b> statistics elective from STATS 100C, 101B, 102C, C151-199: |          |       |
| MATH 170S   | _____   | _____ |   | 1. _____ | _____ |
| <b>or</b>   |         |       |   |          |       |
| <b>B. Intro to Probability and Mathematical Statistics</b>  |         |       |   |          |       |
| STATS 100A  | _____   | _____ |   |          |       |
| STATS 100B  | _____   | _____ |   |          |       |

**One** mathematics elective from: MATH 151A, 151B, 164, 168, 171, 174E, 178A, 178B, 178C, 179, 182:

1. \_\_\_\_\_

**Two** additional electives from the mathematics and/or statistics electives listed before:

1. \_\_\_\_\_

2. \_\_\_\_\_

**One** capstone course: MATH M148 **or** STATS M148 (to be taken in the final year):

1. \_\_\_\_\_

<sup>+</sup>Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# FINANCIAL ACTUARIAL MATHEMATICS B.S.

## PRE-MAJOR: 13 COURSES

Students can declare the pre-major at any time while in good academic standing.

|           | Quarter | Grade |           | Quarter | Grade |
|-----------|---------|-------|-----------|---------|-------|
| MATH 31A* | _____   | _____ | ECON 1**  | _____   | _____ |
| MATH 31B* | _____   | _____ | ECON 2**  | _____   | _____ |
| MATH 32A* | _____   | _____ | ECON 11** | _____   | _____ |
| MATH 32B* | _____   | _____ | MGMT 1A** | _____   | _____ |
| MATH 33A* | _____   | _____ |           |         |       |
| MATH 33B* | _____   | _____ |           |         |       |
| PIC 10A*  | _____   | _____ |           |         |       |
| PIC 16A*  | _____   | _____ |           |         |       |

**One** course from the following\*: MATH 11N, 42, 61, or 70

1. \_\_\_\_\_

\*Mathematics sequenced courses, \*\* Economics preparation courses: Each are calculated separately and must be completed with a minimum overall 2.5 grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major. Repetition of more than one economics preparation course, or of any economics preparation course more than once, results in automatic dismissal from the major.

## THE MAJOR: 12 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|  | Quarter | Grade |           | Quarter | Grade |
|--|---------|-------|-----------|---------|-------|
| MATH 115A <sup>+</sup>                                 | _____   | _____ | MATH 178A | _____   | _____ |
| MATH 131A <sup>+</sup>                                 | _____   | _____ | MATH 178B | _____   | _____ |
| MATH 177   | _____   | _____ | MATH 178C | _____   | _____ |
| MATH 174E  | _____   | _____ | MATH 179  | _____   | _____ |
| (ECON 141, <b>or</b> STATS C183/C283 is also accepted) |         |       |           |         |       |
| MATH 170E  | _____   | _____ |           |         |       |
| MATH 170S  | _____   | _____ |           |         |       |

**Two** upper division economics, mathematics, or statistics courses:

MATH 106-199, ECON 101–199, STATS 100C

1. \_\_\_\_\_

2. \_\_\_\_\_

<sup>+</sup>Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS OF COMPUTATION B.S.

## PRE-MAJOR: 13 COURSES

Students can declare the pre-major at any time while in good academic standing.

One course from the following:

|            | Quarter | Grade |            | Quarter | Grade |
|------------|---------|-------|------------|---------|-------|
| MATH 31A*  | _____   | _____ | CHEM 20A   | _____   | _____ |
| MATH 31B*  | _____   | _____ | CHEM 20B   | _____   | _____ |
| MATH 32A*  | _____   | _____ | PHYSICS 1C | _____   | _____ |
| MATH 32B*  | _____   | _____ |            |         |       |
| MATH 33A*  | _____   | _____ |            |         |       |
| MATH 33B*  | _____   | _____ |            |         |       |
| MATH 61    | _____   | _____ |            |         |       |
| PHYSICS 1A | _____   | _____ |            |         |       |
| PHYSICS 1B | _____   | _____ |            |         |       |
| PIC 10A    | _____   | _____ |            |         |       |
| PIC 10B    | _____   | _____ |            |         |       |
| PIC 10C    | _____   | _____ |            |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

Acceptable substitutions for pre-major requirements:

CS 31 for PIC 10A, CS 32 for PIC 10B, [CS 33 AND 35L] for PIC 10C

Completing PIC 10ABC will meet the requisite for some CS courses that require CS 32. Additional classes might have to be taken to meet other requisites. For more information and help with enrollment in CS courses, contact Engineering.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

Six upper division mathematics courses chosen from:  
MATH 106–199, STATS 100A–102C

|                        | Quarter | Grade |    | Quarter | Grade |
|------------------------|---------|-------|----|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | 1. | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | 2. | _____   | _____ |
| MATH 131B              | _____   | _____ | 3. | _____   | _____ |
| or MATH 132            | _____   | _____ | 4. | _____   | _____ |
| MATH 151A              | _____   | _____ | 5. | _____   | _____ |
| MATH 151B              | _____   | _____ | 6. | _____   | _____ |

Three upper division computer science courses:

|    |       |       |
|----|-------|-------|
| 1. | _____ | _____ |
| 2. | _____ | _____ |
| 3. | _____ | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS OF COMPUTATION B.S.

## PRE-MAJOR: 13 COURSES

Students can declare the pre-major at any time while in good academic standing.

One course from the following:

|            | Quarter | Grade |            | Quarter | Grade |
|------------|---------|-------|------------|---------|-------|
| MATH 31A*  | _____   | _____ | CHEM 20A   | _____   | _____ |
| MATH 31B*  | _____   | _____ | CHEM 20B   | _____   | _____ |
| MATH 32A*  | _____   | _____ | PHYSICS 1C | _____   | _____ |
| MATH 32B*  | _____   | _____ |            |         |       |
| MATH 33A*  | _____   | _____ |            |         |       |
| MATH 33B*  | _____   | _____ |            |         |       |
| MATH 61*   | _____   | _____ |            |         |       |
| PHYSICS 1A | _____   | _____ |            |         |       |
| PHYSICS 1B | _____   | _____ |            |         |       |
| PIC 10A    | _____   | _____ |            |         |       |
| PIC 10B    | _____   | _____ |            |         |       |
| PIC 10C    | _____   | _____ |            |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

Acceptable substitutions for pre-major requirements:

CS 31 for PIC 10A, CS 32 for PIC 10B, [CS 33 AND 35L] for PIC 10C

Completing PIC 10ABC will meet the requisite for some CS courses that require CS 32. Additional classes might have to be taken to meet other requisites. For more information and help with enrollment in CS courses, contact Engineering.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

Six upper division mathematics courses chosen from:  
MATH 106–199, STATS 100A–102C

|                        | Quarter | Grade |    | Quarter | Grade |
|------------------------|---------|-------|----|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | 1. | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | 2. | _____   | _____ |
| MATH 131B              | _____   | _____ | 3. | _____   | _____ |
| or MATH 132            | _____   | _____ | 4. | _____   | _____ |
| MATH 151A              | _____   | _____ | 5. | _____   | _____ |
| MATH 151B              | _____   | _____ | 6. | _____   | _____ |

Three upper division computer science courses:

|    |       |       |
|----|-------|-------|
| 1. | _____ | _____ |
| 2. | _____ | _____ |
| 3. | _____ | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS/APPLIED SCIENCE B.S. HISTORY OF SCIENCE PLAN

## PRE-MAJOR: 10 COURSES

Students can declare the pre-major at any time while in good academic standing.

|           | Quarter | Grade | <b>Three</b> courses from the following: | Quarter | Grade |
|-----------|---------|-------|--|---------|-------|
| MATH 31A* | _____   | _____ |  |         |       |
| MATH 31B* | _____   | _____ | HISTORY 2B                               | _____   | _____ |
| MATH 32A* | _____   | _____ | HISTORY 2C                               | _____   | _____ |
| MATH 32B* | _____   | _____ | HISTORY 3A                               | _____   | _____ |
| MATH 33A* | _____   | _____ | HISTORY 3B                               | _____   | _____ |
| MATH 33B* | _____   | _____ | HISTORY 3C                               | _____   | _____ |
| PIC 10A   | _____   | _____ | HISTORY 3D                               | _____   | _____ |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                           | Quarter | Grade | <b>Three</b> upper division mathematics courses chosen from:<br>MATH 110A–199 | Quarter | Grade |
|---------------------------|---------|-------|---|---------|-------|
| 1. MATH 115A <sup>+</sup> | _____   | _____ |   |         |       |
| 2. MATH 131A <sup>+</sup> | _____   | _____ | 1. _____  | _____   | _____ |
| 3. MATH 106               | _____   | _____ | 2. _____  | _____   | _____ |
| 4. MATH 134               | _____   | _____ | 3. _____  | _____   | _____ |
| 5. MATH 170A              | _____   | _____ |   |         |       |

**Six** upper division courses from history, philosophy, or physical science, including five courses from the following<sup>1</sup>:

|                  |       |       |                 |       |       |
|------------------|-------|-------|-----------------|-------|-------|
| 1. HISTORY 179A  | _____ | _____ | 6. PHILOS 124   | _____ | _____ |
| 2. HISTORY 179B  | _____ | _____ | 7. NEURBIO M169 | _____ | _____ |
| 3. HISTORY 180A  | _____ | _____ |                 |       |       |
| 4. HISTORY M180B | _____ | _____ |                 |       |       |
| 5. HISTORY 180C  | _____ | _____ |                 |       |       |

**One** Honors Collegium course with "history of science or medicine" content<sup>1</sup>:

|          |       |       |         |       |
|----------|-------|-------|---------|-------|
| 1. _____ | _____ | _____ | Quarter | Grade |
|----------|-------|-------|---------|-------|

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

<sup>1</sup>Students can petition with the mathematics department for other courses not on this list to fulfill the major requirements.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS/APPLIED SCIENCE B.S. HISTORY OF SCIENCE PLAN

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                       | Quarter | Grade | <b>Three</b> courses from the following: | Quarter | Grade |
|-----------------------|---------|-------|--|---------|-------|
| MATH 31A*             | _____   | _____ |  |         |       |
| MATH 31B*             | _____   | _____ | HISTORY 2B                               | _____   | _____ |
| MATH 32A*             | _____   | _____ | HISTORY 2C                               | _____   | _____ |
| MATH 32B*             | _____   | _____ | HISTORY 3A                               | _____   | _____ |
| MATH 33A*             | _____   | _____ | HISTORY 3B                               | _____   | _____ |
| MATH 33B*             | _____   | _____ | HISTORY 3C                               | _____   | _____ |
| MATH 11 <b>or</b> 61* | _____   | _____ | HISTORY 3D                               | _____   | _____ |
| PIC 10A               | _____   | _____ |  |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                           | Quarter | Grade | <b>Three</b> upper division mathematics courses chosen from:<br>MATH 110A–199 | Quarter | Grade |
|---------------------------|---------|-------|---|---------|-------|
| 1. MATH 115A <sup>+</sup> | _____   | _____ |   |         |       |
| 2. MATH 131A <sup>+</sup> | _____   | _____ | 1. _____  | _____   | _____ |
| 3. MATH 106               | _____   | _____ | 2. _____  | _____   | _____ |
| 4. MATH 134               | _____   | _____ | 3. _____  | _____   | _____ |
| 5. MATH 170A              | _____   | _____ |   |         |       |

**Six** upper division courses from history, philosophy, or physical science, including five courses from the following<sup>1</sup>:

|                  |       |       |                 |       |       |
|------------------|-------|-------|-----------------|-------|-------|
| 1. HISTORY 179A  | _____ | _____ | 6. PHILOS 124   | _____ | _____ |
| 2. HISTORY 179B  | _____ | _____ | 7. NEURBIO M169 | _____ | _____ |
| 3. HISTORY 180A  | _____ | _____ |                 |       |       |
| 4. HISTORY M180B | _____ | _____ |                 |       |       |
| 5. HISTORY 180C  | _____ | _____ |                 |       |       |

**One** Honors Collegium course with "history of science or medicine" content<sup>1</sup>:

|          | Quarter | Grade |
|----------|---------|-------|
| 1. _____ | _____   | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

<sup>1</sup>Students can petition with the mathematics department for other courses not on this list to fulfill the major requirements.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS/APPLIED SCIENCE B.S. MEDICAL AND LIFE SCIENCE PLAN

## PRE-MAJOR: 18 COURSES

Students can declare the pre-major at any time while in good academic standing.

|            | Quarter | Grade |             | Quarter | Grade |
|------------|---------|-------|-------------|---------|-------|
| MATH 31A*  | _____   | _____ | CHEM 20A    | _____   | _____ |
| MATH 31B*  | _____   | _____ | CHEM 20B    | _____   | _____ |
| MATH 32A*  | _____   | _____ | CHEM 20L    | _____   | _____ |
| MATH 32B*  | _____   | _____ | CHEM 30A    | _____   | _____ |
| MATH 33A*  | _____   | _____ | CHEM 30AL   | _____   | _____ |
| MATH 33B*  | _____   | _____ | LIFESCI 7A  | _____   | _____ |
| PIC 10A    | _____   | _____ | LIFESCI 7B  | _____   | _____ |
| PHYSICS 1A | _____   | _____ | LIFESCI 7C  | _____   | _____ |
| PHYSICS 1B | _____   | _____ | LIFESCI 23L | _____   | _____ |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 13 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                                  | Quarter | Grade |  | Quarter  | Grade |       |
|----------------------------------|---------|-------|--|--|-------|-------|
| MATH 115A <sup>+</sup>           | _____   | _____ | <b>Six</b> upper division outside science courses <sup>1</sup> : |  |       |       |
| MATH 131A <sup>+</sup>           | _____   | _____ |  | PHYSICI M180A  | _____ | _____ |
| MATH 134                         | _____   | _____ |  | PHYSICI M180B  | _____ | _____ |
| MATH 151A                        | _____   | _____ |  | PHYSICI M180C  | _____ | _____ |
| MATH 170E<br><b>or</b> MATH 170A | _____   | _____ |  | Same as MCDB M175A-M175B-M175C,<br>NEURSCI M101A-M101B-M101C,<br>and PSYCH M117A-M117B-M117C |       |       |
| MATH 170S<br><b>or</b> MATH 170B | _____   | _____ |  |  |       |       |

**One** upper division mathematics course chosen from:  
MATH 110A–199, STATS 100B–101C

1. \_\_\_\_\_

\*Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

<sup>1</sup>Students can petition with the mathematics department for other courses not on this list to fulfill the major requirements.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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**Three** upper division courses from the following<sup>1</sup>:

|               |       |       |
|---------------|-------|-------|
| BIOMATH 160   | _____ | _____ |
| BIOSTAT 100A  | _____ | _____ |
| CHEM CM160A   | _____ | _____ |
| COM SCI CM186 | _____ | _____ |
| EEB C119A     | _____ | _____ |
| EEB 133       | _____ | _____ |
| EEB C135      | _____ | _____ |
| LIFESCI 107   | _____ | _____ |
| PHYSICI 100   | _____ | _____ |
| PHYSICI 135   | _____ | _____ |

# MATHEMATICS/APPLIED SCIENCE B.S. MEDICAL AND LIFE SCIENCE PLAN

## PRE-MAJOR: 19 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                       | Quarter | Grade |             | Quarter | Grade |
|-----------------------|---------|-------|-------------|---------|-------|
| MATH 31A*             | _____   | _____ | CHEM 20A    | _____   | _____ |
| MATH 31B*             | _____   | _____ | CHEM 20B    | _____   | _____ |
| MATH 32A*             | _____   | _____ | CHEM 20L    | _____   | _____ |
| MATH 32B*             | _____   | _____ | CHEM 30A    | _____   | _____ |
| MATH 33A*             | _____   | _____ | CHEM 30AL   | _____   | _____ |
| MATH 33B*             | _____   | _____ | LIFESCI 7A  | _____   | _____ |
| MATH 11 <b>or</b> 61* | _____   | _____ | LIFESCI 7B  | _____   | _____ |
| PIC 10A               | _____   | _____ | LIFESCI 7C  | _____   | _____ |
| PHYSICS 1A            | _____   | _____ | LIFESCI 23L | _____   | _____ |
| PHYSICS 1B            | _____   | _____ |             |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 13 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                                  | Quarter | Grade |  | Quarter | Grade |
|----------------------------------|---------|-------|--|---------|-------|
| MATH 115A <sup>+</sup>           | _____   | _____ | <b>Six</b> upper division outside science courses <sup>1</sup> :                             |         |       |
| MATH 131A <sup>+</sup>           | _____   | _____ | PHYSCI M180A   | _____   | _____ |
| MATH 134                         | _____   | _____ | PHYSCI M180B   | _____   | _____ |
| MATH 151A                        | _____   | _____ | PHYSCI M180C   | _____   | _____ |
| MATH 170E<br><b>or</b> MATH 170A | _____   | _____ | Same as MCDB M175A-M175B-M175C,<br>NEURSCI M101A-M101B-M101C,<br>and PSYCH M117A-M117B-M117C |         |       |
| MATH 170S<br><b>or</b> MATH 170B | _____   | _____ |  |         |       |

**One** upper division mathematics course chosen from:  
MATH 110A-199, STATS 100B-101C

1. \_\_\_\_\_

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

<sup>1</sup>Students can petition with the mathematics department for other courses not on this list to fulfill the major requirements.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

**Three** upper division courses from the following<sup>1</sup>:

|               |       |       |
|---------------|-------|-------|
| BIOMATH 160   | _____ | _____ |
| BIOSTAT 100A  | _____ | _____ |
| CHEM CM160A   | _____ | _____ |
| COM SCI CM186 | _____ | _____ |
| EEB C119A     | _____ | _____ |
| EEB 133       | _____ | _____ |
| EEB C135      | _____ | _____ |
| LIFESCI 107   | _____ | _____ |
| PHYSICI 100   | _____ | _____ |
| PHYSICI 135   | _____ | _____ |

# MATHEMATICS/APPLIED SCIENCE B.S. INDIVIDUAL PLAN

## PRE-MAJOR: 7 COURSES

Students can declare the pre-major at any time while in good academic standing.

|           | Quarter | Grade |
|-----------|---------|-------|
| MATH 31A* | _____   | _____ |
| MATH 31B* | _____   | _____ |
| MATH 32A* | _____   | _____ |
| MATH 32B* | _____   | _____ |
| MATH 33A* | _____   | _____ |
| MATH 33B* | _____   | _____ |
| PIC 10A   | _____   | _____ |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

**Seven** upper division mathematics courses chosen from: MATH 106–199:

|                           | Quarter | Grade |
|---------------------------|---------|-------|
| 1. MATH 115A <sup>+</sup> | _____   | _____ |
| 2. MATH 131A <sup>+</sup> | _____   | _____ |
| 3. _____                  | _____   | _____ |
| 4. _____                  | _____   | _____ |
| 5. _____                  | _____   | _____ |

**One** 2-quarter mathematics sequence:

|          |       |       |
|----------|-------|-------|
| 6. _____ | _____ | _____ |
| 7. _____ | _____ | _____ |

**Seven** upper division courses chosen from 1-2 related fields:

|          | Quarter | Grade |
|----------|---------|-------|
| 1. _____ | _____   | _____ |
| 2. _____ | _____   | _____ |
| 3. _____ | _____   | _____ |
| 4. _____ | _____   | _____ |
| 5. _____ | _____   | _____ |
| 6. _____ | _____   | _____ |
| 7. _____ | _____   | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

I understand that if I wish to make any changes to my Individual plan, I must first obtain written approval from the Student Services Office in MS 6356.

Student's Signature \_\_\_\_\_ Date \_\_\_\_\_

Undergraduate Vice-Chair's Signature \_\_\_\_\_ Date \_\_\_\_\_

# MATHEMATICS/APPLIED SCIENCE B.S. INDIVIDUAL PLAN

## PRE-MAJOR: 8 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                | Quarter | Grade |
|----------------|---------|-------|
| MATH 31A*      | _____   | _____ |
| MATH 31B*      | _____   | _____ |
| MATH 32A*      | _____   | _____ |
| MATH 32B*      | _____   | _____ |
| MATH 33A*      | _____   | _____ |
| MATH 33B*      | _____   | _____ |
| MATH 11 or 61* | _____   | _____ |
| PIC 10A*       | _____   | _____ |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of "C" or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

**Seven** upper division mathematics courses chosen from: MATH 106–199:

|                           | Quarter | Grade |
|---------------------------|---------|-------|
| 1. MATH 115A <sup>+</sup> | _____   | _____ |
| 2. MATH 131A <sup>+</sup> | _____   | _____ |
| 3. _____                  | _____   | _____ |
| 4. _____                  | _____   | _____ |
| 5. _____                  | _____   | _____ |

**One** 2-quarter mathematics sequence:

|          |       |       |
|----------|-------|-------|
| 6. _____ | _____ | _____ |
| 7. _____ | _____ | _____ |

**Seven** upper division courses chosen from 1-2 related fields:

|          | Quarter | Grade |
|----------|---------|-------|
| 1. _____ | _____   | _____ |
| 2. _____ | _____   | _____ |
| 3. _____ | _____   | _____ |
| 4. _____ | _____   | _____ |
| 5. _____ | _____   | _____ |
| 6. _____ | _____   | _____ |
| 7. _____ | _____   | _____ |

<sup>+</sup>Students must pass this course with a "C-" or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

I understand that if I wish to make any changes to my Individual plan, I must first obtain written approval from the Student Services Office in MS 6356.

Student's Signature \_\_\_\_\_ Date \_\_\_\_\_

Undergraduate Vice-Chair's Signature \_\_\_\_\_ Date \_\_\_\_\_

# MATHEMATICS FOR TEACHING B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

Two courses from the following:

|                         | Quarter | Grade |                         | Quarter | Grade |
|-------------------------|---------|-------|-------------------------|---------|-------|
| MATH 31A*               | _____   | _____ | CHEM 20A                | _____   | _____ |
| MATH 31B*               | _____   | _____ | CHEM 20B                | _____   | _____ |
| MATH 32A*               | _____   | _____ | PHYSICS 1B <b>or</b> 5B | _____   | _____ |
| MATH 32B*               | _____   | _____ | PHYSICS 1C <b>or</b> 5C | _____   | _____ |
| MATH 33A*               | _____   | _____ | PIC 10B–97              | _____   | _____ |
| MATH 33B*               | _____   | _____ |                         |         |       |
| MATH 61                 | _____   | _____ |                         |         |       |
| PHYSICS 1A <b>or</b> 5A | _____   | _____ |                         |         |       |
| PIC 10A                 | _____   | _____ |                         |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 13 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                        | Quarter | Grade |   | Quarter | Grade |
|------------------------|---------|-------|---|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | <b>Mathematics Analysis</b>                               |         |       |
| MATH 131A <sup>+</sup> | _____   | _____ | <b>One</b> course chosen from MATH 131B–136               |         |       |
| MATH 105A              | _____   | _____ | 1. _____  |         |       |
| MATH 105B              | _____   | _____ | <b>Applied Mathematics</b>                                |         |       |
| MATH 105C              | _____   | _____ | <b>One</b> course chosen from MATH 142–168                |         |       |
| MATH 106               | _____   | _____ | 1. _____  |         |       |
| MATH 117               | _____   | _____ | <b>Upper Division Mathematics</b>                         |         |       |
| <b>or</b> MATH 110A    | _____   | _____ | <b>One</b> course chosen from MATH 110B–191 or STATS 100C |         |       |
| MATH 123               | _____   | _____ | 1. _____  |         |       |
| <b>or</b> MATH 120A    | _____   | _____ |   |         |       |
| MATH 170A              | _____   | _____ |   |         |       |
| <b>or</b> STATS 100A   | _____   | _____ |   |         |       |
| STATS 100B             | _____   | _____ |   |         |       |

In order to receive a 100% CSET waiver from UCLA, students must have “C-” or better in the following courses and an upper division GPA of 2.0 or higher: MATH 117 or MATH 110A, MATH 123 or MATH 120A, MATH 131A, MATH 105A, MATH 105B, and MATH 105C.

[curtiscenter.math.ucla.edu/students/undergraduates](http://curtiscenter.math.ucla.edu/students/undergraduates)

\*Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS FOR TEACHING B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                         | Quarter | Grade | <b>Two</b> courses from the following: | Quarter | Grade |
|-------------------------|---------|-------|--|---------|-------|
| MATH 31A*               | _____   | _____ | CHEM 20A                               | _____   | _____ |
| MATH 31B*               | _____   | _____ | CHEM 20B                               | _____   | _____ |
| MATH 32A*               | _____   | _____ | PHYSICS 1B <b>or</b> 5B                | _____   | _____ |
| MATH 32B*               | _____   | _____ | PHYSICS 1C <b>or</b> 5C                | _____   | _____ |
| MATH 33A*               | _____   | _____ | PIC 10B–97                             | _____   | _____ |
| MATH 33B*               | _____   | _____ |  |         |       |
| MATH 61*                | _____   | _____ |  |         |       |
| PHYSICS 1A <b>or</b> 5A | _____   | _____ |  |         |       |
| PIC 10A                 | _____   | _____ |  |         |       |

\*The mathematics sequenced courses are calculated separately from the other preparation for the major courses and must be completed with a minimum overall 2.5 grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.

## THE MAJOR: 13 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                        | Quarter | Grade |   | Quarter | Grade |
|------------------------|---------|-------|---|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | <b>Mathematics Analysis</b>                               |         |       |
| MATH 131A <sup>+</sup> | _____   | _____ | <b>One</b> course chosen from MATH 131B–136               |         |       |
| MATH 105A              | _____   | _____ | 1. _____  |         |       |
| MATH 105B              | _____   | _____ | <b>Applied Mathematics</b>                                |         |       |
| MATH 105C              | _____   | _____ | <b>One</b> course chosen from MATH 142–168                |         |       |
| MATH 106               | _____   | _____ | 1. _____  |         |       |
| MATH 117               | _____   | _____ | <b>Upper Division Mathematics</b>                         |         |       |
| <b>or</b> MATH 110A    | _____   | _____ | <b>One</b> course chosen from MATH 110B–191 or STATS 100C |         |       |
| MATH 123               | _____   | _____ | 1. _____  |         |       |
| <b>or</b> MATH 120A    | _____   | _____ |   |         |       |
| MATH 170A              | _____   | _____ |   |         |       |
| <b>or</b> STATS 100A   | _____   | _____ |   |         |       |
| STATS 100B             | _____   | _____ |   |         |       |

In order to receive a 100% CSET waiver from UCLA, students must have “C-” or better in the following courses and an upper division GPA of 2.0 or higher: MATH 117 or MATH 110A, MATH 123 or MATH 120A, MATH 131A, MATH 105A, MATH 105B, and MATH 105C.

<https://curtiscenter.math.ucla.edu/students/undergraduates/>

\*Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS/ECONOMICS B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|           | Quarter | Grade |           | Quarter | Grade |
|-----------|---------|-------|-----------|---------|-------|
| MATH 31A* | _____   | _____ | ECON 1**  | _____   | _____ |
| MATH 31B* | _____   | _____ | ECON 2**  | _____   | _____ |
| MATH 32A* | _____   | _____ | ECON 11** | _____   | _____ |
| MATH 32B* | _____   | _____ |           |         |       |
| MATH 33A* | _____   | _____ |           |         |       |
| MATH 33B* | _____   | _____ |           |         |       |
| MATH 61*  | _____   | _____ |           |         |       |
| PIC 10A*  | _____   | _____ |           |         |       |

\*Mathematics sequenced courses, \*\* Economics preparation courses: Each are calculated separately and must be completed with a minimum overall **2.7** grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major. Repetition of more than one economics preparation course, or of any economics preparation course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                        | Quarter | Grade |                       | Quarter | Grade |
|------------------------|---------|-------|-----------------------|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | ECON 101 <sup>+</sup> | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | ECON 102 <sup>+</sup> | _____   | _____ |
| MATH 131B              | _____   | _____ | ECON 103              | _____   | _____ |
| MATH 164               | _____   | _____ | ECON 103L             | _____   | _____ |
| MATH 174E              | _____   | _____ |                       |         |       |

(MATH 179, ECON 141, or STATS C183/C283 is also accepted)

**Two** additional upper division economics courses chosen from: ECON 106–199

1. \_\_\_\_\_
2. \_\_\_\_\_

**One** 2-term probability sequence:

### A. Introduction to Probability and Statistics

|           |       |       |
|-----------|-------|-------|
| MATH 170E | _____ | _____ |
| MATH 170S | _____ | _____ |

or

### B. Probability Theory

|           |       |       |
|-----------|-------|-------|
| MATH 170A | _____ | _____ |
| MATH 170B | _____ | _____ |

**One** upper division mathematics course chosen from:

MATH 134, MATH 135, MATH 136, MATH 171

1. \_\_\_\_\_

<sup>+</sup>Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# MATHEMATICS/ECONOMICS B.S.

## PRE-MAJOR: 11 COURSES

Students can declare the pre-major at any time while in good academic standing.

|                | Quarter | Grade |           | Quarter | Grade |
|----------------|---------|-------|-----------|---------|-------|
| MATH 31A*      | _____   | _____ | ECON 1**  | _____   | _____ |
| MATH 31B*      | _____   | _____ | ECON 2**  | _____   | _____ |
| MATH 32A*      | _____   | _____ | ECON 11** | _____   | _____ |
| MATH 32B*      | _____   | _____ |           |         |       |
| MATH 33A*      | _____   | _____ |           |         |       |
| MATH 33B*      | _____   | _____ |           |         |       |
| MATH 11 or 61* | _____   | _____ |           |         |       |
| PIC 10A*       | _____   | _____ |           |         |       |

\*Mathematics sequenced courses, \*\* Economics preparation courses: Each are calculated separately and must be completed with a minimum overall **2.7** grade-point average and a grade of “C” or better in each course. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major. Repetition of more than one economics preparation course, or of any economics preparation course more than once, results in automatic dismissal from the major.

## THE MAJOR: 14 COURSES

Students must declare the major before reaching 160 units (not including AP units).

|                        | Quarter | Grade |                       | Quarter | Grade |
|------------------------|---------|-------|-----------------------|---------|-------|
| MATH 115A <sup>+</sup> | _____   | _____ | ECON 101 <sup>+</sup> | _____   | _____ |
| MATH 131A <sup>+</sup> | _____   | _____ | ECON 102 <sup>+</sup> | _____   | _____ |
| MATH 131B              | _____   | _____ | ECON 103              | _____   | _____ |
| MATH 164               | _____   | _____ | ECON 103L             | _____   | _____ |
| MATH 174E              | _____   | _____ |                       |         |       |

(MATH 179, ECON 141, or STATS C183/C283 is also accepted)

**Two** additional upper division economics courses chosen from: ECON 106–199

**One** 2-term probability sequence:

### A. Introduction to Probability and Statistics

|           |       |       |
|-----------|-------|-------|
| MATH 170E | _____ | _____ |
| MATH 170S | _____ | _____ |

**or**

### B. Probability Theory

|           |       |       |
|-----------|-------|-------|
| MATH 170A | _____ | _____ |
| MATH 170B | _____ | _____ |

**One** upper division mathematics course chosen from:

MATH 134, MATH 135, MATH 136, MATH 171

1. \_\_\_\_\_

1. \_\_\_\_\_
2. \_\_\_\_\_

<sup>+</sup>Students must pass this course with a “C-” or better. It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All required courses for the major must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

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# SPECIALIZATION IN COMPUTING

The Specialization in Computing provides an extensive education in elementary computer science and an introduction to its applications in mathematics. This not a major, but a supplement to the following majors:

- Mathematics
- Applied Mathematics
- Financial Actuarial Mathematics
- Mathematics/Applied Science
- Mathematics for Teaching
- Mathematics/Economics

Students who complete the specialization will receive a notation on their diploma. Mathematics/Economics majors interested in a Specialization in Computing must follow the specialization offered through the mathematics department.

Students planning to complete the Specialization in Computing must petition to add this program to their major after completing PIC 10B. Petitions should be filed with the Student Services Office in MS 6356.

Students who have added the Specialization in Computing to their major and choose to graduate before completing the specialization must officially drop the program by filing a petition in MS 6356.

## REQUIRED FOR THE SPECIALIZATION: 7 COURSES

|  |         |       |  |         |       |
|--|---------|-------|--|---------|-------|
|  | Quarter | Grade | <b>One</b> mathematics course chosen from:<br>MATH 61, 180*, 182* or 184               |         |       |
| PIC 10A                                    | _____   | _____ |  | Quarter | Grade |
| PIC 10B                                    | _____   | _____ | 1.   | _____   | _____ |
| <b>Two</b> PIC courses from the following: |         |       | <b>Two</b> upper division mathematics courses chosen from:<br>MATH 149–159, 180*, 182* |         |       |
| PIC 10C                                    | _____   | _____ | 1.   | _____   | _____ |
| PIC 15                                     | _____   | _____ | 2.   | _____   | _____ |
| PIC 16A                                    | _____   | _____ |  |         |       |
| PIC 16B                                    | _____   | _____ |  |         |       |
| PIC 20A                                    | _____   | _____ |  |         |       |
| PIC 20B                                    | _____   | _____ |  |         |       |
| PIC 30                                     | _____   | _____ |  |         |       |
| PIC 40A                                    | _____   | _____ |  |         |       |
| PIC 60                                     | _____   | _____ |  |         |       |

All PIC and Math courses applied to the specialization must be completed with a minimum 2.0 GPA, with a grade of “C-” or better in each course.

All required courses for the specialization must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

\*MATH 180 and 182 may only be applied once to the Specialization in Computing.

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

# MINOR IN MATHEMATICS

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The Mathematics minor is designed to provide students who are not math majors the opportunity to deepen their understanding of the role of mathematics in various disciplines.

Students must petition to add this minor after completing 12.0 units of mathematics towards the minor at UCLA. At least one of the courses taken for these 12.0 units must be an upper division course taken at UCLA. Students who have added the minor and choose to graduate before completing the minor must officially drop the minor by filing a petition in the Student Services Office, MS 6356.

## REQUIRED FOR THE MINOR: 8 COURSES

|          | Quarter | Grade |   |       |       |       |
|----------|---------|-------|---|-------|-------|-------|
| MATH 32A | _____   | _____ | <b>Five</b> upper division mathematics courses chosen from:<br>MATH 106–199 |       |       |       |
| MATH 33A | _____   | _____ |   | 1.    | _____ | _____ |
| MATH 33B | _____   | _____ |   | 2.    | _____ | _____ |
|          |         |       |   | 3.    | _____ | _____ |
|          |         |       |   | 4.    | _____ | _____ |
|          |         |       | 5.  | _____ | _____ |       |

Students must complete all lower division courses with grades of “C” or better. Upper division courses must have an overall grade-point average of 2.0 or better when calculated separately from the lower division courses. A minimum of 20.0 units applied toward the Mathematics minor requirements must be in addition to units applied toward major or other minor requirements.

All required courses for the minor must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

Although MATH 31A, 31B, 32B are not required for the minor, all upper division mathematics course prerequisites are enforced for all students.

This minor is not open to students declared in a mathematics major.

[catalog.registrar.ucla.edu](http://catalog.registrar.ucla.edu)

# MINOR IN MATHEMATICS FOR TEACHING

The Mathematics for Teaching minor is designed for students majoring in fields other than mathematics who plan to teach secondary mathematics after graduation. For non-majors joining the mathematics department and School of Education's Joint Mathematics Education Program (JMEP), the minor provides recognition for completion of prerequisite coursework for the program. The minor provides additional upper division course work in mathematics relevant to the secondary school curriculum: algebra, geometry, and analysis. This coursework also prepares students for content on the California Subject Examination for Teachers, which is required to prove competence in the subject matter. In addition, the minor provides the coursework on Secondary mathematics from an advanced standpoint which is recommended by the Conference Board of Mathematical Sciences.

To enter the minor, students must have completed Mathematics 115A with a grade of "C" or better. If Mathematics 115A was not completed at UCLA, students must show proof that they completed an equivalent course with a grade of "C" or better.

Students who have added the minor and choose to graduate before completing the minor must officially drop the program by filing a petition in the Student Services Office, MS 6356.

A minimum of 20.0 units applied toward the Mathematics for Teaching minor requirement must be in addition to units applied toward major or other minor requirements.

## REQUIRED FOR THE MINOR: 7 COURSES

|                          | Quarter | Grade |
|--------------------------|---------|-------|
| MATH 115A <sup>+</sup>   | _____   | _____ |
| MATH 117<br>or MATH 110A | _____   | _____ |
| MATH 123<br>or MATH 120A | _____   | _____ |
| MATH 131A                | _____   | _____ |
| MATH 105A                | _____   | _____ |
| MATH 105B                | _____   | _____ |
| MATH 105C                | _____   | _____ |

<sup>+</sup>It is strongly recommended that students take MATH 115A as one of their first upper division courses before MATH 131A.

All upper division mathematics courses must be completed with a minimum 2.0 GPA, with a grade of "C-" or better in each course.

All required courses for the minor must be at least 4.0 units and taken for a letter grade, unless the class is a supplement to a larger course (e.g. a required lab).

Although MATH 31A, 31B, 32A, 32B, 33A, and 33B are not required for the minor, all upper division mathematics course prerequisites are enforced for all students.

This minor is not open to students declared in a mathematics major.

<http://catalog.registrar.ucla.edu>

# SUGGESTED ACADEMIC SCHEDULE

## MINIMUM REQUIREMENTS

- Pass the calculus sequenced courses with a letter grade of “C” or better in each course, and with a minimum overall 2.5 grade point average. Repetition of more than two mathematics sequenced courses, or of any mathematics sequenced course more than once, results in automatic dismissal from the major.
- The Mathematics/Economics major requires a minimum overall **2.7** grade point average. The Data Theory major requires a minimum overall **3.3** grade point average.
- Pass MATH 115A and 131A with a grade of “C-” or better in each course.

Students must declare a math major before reaching 160.0 units (minus AP units awarded). Pre-major requirements will vary depending on the major.

|                    |   |   |
|--------------------|---|---|
| <b>FIRST YEAR</b>  | MATH 31A<br>MATH 31B<br>MATH 32A                                    | <p><b>ALL MAJORS</b></p> <p>Start the two-year calculus sequence with MATH 31A, MATH 31B or MATH 32A according to initial placement. Take one course per quarter until done. Begin taking other required pre-major courses.</p>   |
| <b>SECOND YEAR</b> | MATH 32B<br>MATH 33A<br>MATH 33B<br>(MATH 11's)                     | <p><b>ALL MAJORS</b></p> <p>Finish the two-year calculus sequence.</p> <p>Take MATH 115A if MATH 33A is completed.</p> <p>Recommended: MATH 11's for more practice in abstract math.</p>  |
| <b>THIRD YEAR</b>  | MATH 115A<br>MATH 131A<br>+ Other Upper Division Major Requirements | <p><b>ALL MAJORS</b></p> <p>Take MATH 115A, if not taken at the end of 2nd Year.</p> <p>Take MATH 131A. It is strongly recommended to take this course after taking MATH 115A. For everything else, let your interests guide you. You can take the course as long as you meet the prerequisites.</p> <p><b>MATHEMATICS</b></p> <p>MATH 131B, MATH 132, MATH 110A, MATH 110B, MATH 120A</p> <p><b>APPLIED MATHEMATICS</b></p> <p>MATH 132 or MATH 131B, MATH 142, at least one of the required two-quarter sequences and/or math electives</p> <p><b>DATA THEORY</b></p> <p>MATH 118, [MATH 170E and 170S] or [STATS 100A and 100B], STATS 101A, STATS 101C, STATS 102A, STATS 102B</p> <p><b>FINANCIAL-ACTUARIAL MATHEMATICS</b></p> <p>MATH 170E, MATH 170S, MATH 177, MATH 178A, MATH 178B</p> <p><b>MATHEMATICS OF COMPUTATION</b></p> <p>[MATH 131B or MATH 132], MATH 151A, MATH 151B, MATH and/or CS electives</p> <p><b>MATHEMATICS/ECONOMICS</b></p> <p>MATH 131B, [MATH 170E and 170S], ECON 101, ECON 102, ECON 103 + ECON 103L</p> <p><b>MATHEMATICS FOR TEACHING</b></p> <p>[MATH 117 or MATH 110A], [MATH 123 or MATH 120A], [MATH 170A or STATS 100A], math electives</p> |
| <b>FOURTH YEAR</b> | Remaining Upper Division Major Requirements                         | <p><b>ALL MAJORS</b></p> <p>Complete the major requirements.</p>  |

[www.ugeducation.ucla.edu/degreepath/majors](http://www.ugeducation.ucla.edu/degreepath/majors)  
<https://ucla.mymajors.com/quiz/?>

# DEPARTMENTAL HONORS & SCHOLAR PROGRAMS

The Departmental Honors and Scholar Programs are two of our most rigorous programs, designed to further prepare students for graduate study.

While the Departmental Honors Program grants eligible students the opportunity to work closer with faculty and apply their learning to an original project, the Departmental Scholar Program allows students with exceptional academic records to simultaneously pursue a Bachelors (B.S.) and Masters (M.A.) degree in mathematics.

If you are interested in applying or have any questions about either of these programs, please consult with an undergraduate math advisor.

## ADMISSION TO THE HONORS PROGRAM

To be considered for admission to the Departmental Honors Program for any math major, a student must:

- Be officially enrolled in his/her respective math major;
- Have completed at least four courses at UCLA in the mathematics department from those required in the "Preparation for the Major" or "Major"; and
- Have at least a 3.6 GPA in such mathematics courses taken at UCLA

To be considered for admission to the Honors Program in Mathematics/Economics, a student must:

- Be officially enrolled in the Mathematics/Economics major;
- Have completed all of the "Preparation for the Major" courses; and
- Have at least a 3.6 GPA in the "Preparation for the Major"

In addition to the requirements listed above, students must complete specific courses within the major. Please refer to our website at for more information and consult with the undergraduate math advisor.

[www.math.ucla.edu/ugrad/honor-programs](http://www.math.ucla.edu/ugrad/honor-programs)

## ELIGIBILITY AND TIMELINE FOR THE SCHOLAR PROGRAM

Admission to the Departmental Scholars Program is by application only. Students typically apply immediately after passing the Basic Exam, no later than the end of their Junior Year. In addition, candidates must fulfill all University level requirements:

- Cumulative UC GPA of 3.5 or higher
- Undergraduate major GPA of 3.5 or higher
- Completion of 24 courses (96.0 *undergraduate* quarter units - AP units, or similar, do not apply)
- Completion of preparation for the major
- Satisfy the Writing II requirement with a grade of "C" or better.

A successful applicant will have passed the Basic Exam, have a very high GPA in math courses, and have letters of recommendation from at least two (2) ladder faculty that strongly support the application. Applications are reviewed and decided by the Undergraduate and Graduate program faculty, in consultation with other faculty.

To apply, students must meet the following requirements:

- Be declared in a mathematics major
- Pass the Basic Exam no later than the beginning of spring quarter of their third year.

To remain in the program, students must meet the following requirements:

- Remain a UCLA mathematics student in good academic standing
- Maintain at least a 3.5 GPA in mathematics courses at all times

The following timeline is recommended:

### FIRST YEAR

Complete or have credit from another institution, all lower-division calculus-based courses (MATH 31A, 31B, 32A, 32B, 33A, 33B). If possible take MATH 115AH in spring. Complete Writing II requirement.

### SECOND YEAR

Complete pre-major courses, take MATH 115AH (Honors Linear Algebra), 115B (Linear Algebra), 131AH (Honors Analysis) and 131BH (Honors Analysis). Begin preparation for Basic Exam (offered in September and March) using online copies of past exams.

### THIRD YEAR

Pass the Basic Qualifying Exam, preferably by the start of fall quarter. Apply to the Scholars program immediately after passing the Basic. Complete remaining undergraduate math major courses. During the quarter of admission to the Scholars program, it is possible to begin graduate coursework which counts toward the Master's Degree. Only graduate courses taken after acceptance into the program can count towards the M.A.

### FOURTH YEAR

Complete remaining graduate level courses for the M.A. The M.A. requirements include 11 courses, of which eight (8) must be graduate math courses, in addition to the B.S. requirements. Three courses can be upper division math courses that must be pre-approved by the Math Department.

[www.math.ucla.edu/ugrad/scholar](http://www.math.ucla.edu/ugrad/scholar)

# GRADUATE SCHOOL OPPORTUNITIES

Graduate school is an opportunity to examine a field of your choice with more specificity and direction. It gives you the tools you need to succeed in the industry of your choice. Preparation for grad school can begin as early as your first year of college.

Graduate school constitutes an advanced program of study focused on a particular academic discipline or profession. Traditionally, graduate school has been “academic” (centered on generating original research in a particular discipline), but it may be “professional” (centered on developing skills and knowledge for a specific profession), or a combination of both.

Successful graduate work in mathematics requires skills in formal reasoning and in constructing rigorous mathematical proofs. These skills are more essential for success at the graduate level than is the knowledge of any particular topic. The honors sequences will provide training in these skills to a far greater degree than the regular sequences. In fact, a typical graduate admissions committee will look more favorably upon an “A-” earned in a honors sequence than a “A”, or even “A+”, earned in the regular sequence.

Most applications for graduate programs in mathematics must be submitted between December and February, so it is best to contact colleges during the summer or access their websites for online applications and additional information.

Most universities will require the following materials with their applications:

- Three letters of recommendation
- GRE general and mathematics subject exams
- Personal statement

## RECOMMENDED COURSES TO PREPARE FOR GRADUATE SCHOOL

### For Pure Mathematics

- MATH 115AH + 115B
- MATH 131AB (Honors) + 131C
- MATH 110AB (Honors) + 110C
- MATH 120A, 121
- MATH 132H
- MATH 133, 134, 135 and 136

### For Applied Mathematics

- MATH 115AH + 115B
- MATH 131AB (Honors) + 131C
- MATH 110AB (Honors) + 110C
- MATH 132H
- MATH 133, 134, 135 and 136
- MATH 151AB, 155, 156
- MATH 170AB, 171

Do research on the graduate or professional schools you are interested in before meeting with an undergraduate math advisors.

Visit the Career Center for information about applying to medical or professional schools.

[www.career.ucla.edu](http://www.career.ucla.edu)

## TIMELINE

One of the initial steps in applying to a graduate or professional school is to research application deadlines so that you can develop a timeline of when to submit test scores, letters of recommendation, personal essays, etc. Below is a general timeline to help you in planning your application process.

### Junior Year

- Begin researching available programs
  - Review grad school guides/directories
  - Request promotional materials
  - Visit schools’ websites
  - Talk to faculty/alumni/current students in the program
- Start exploring financial aid resources
- Sign up for required standardized test and take a practice test
- Identify potential letter writers
- Order an unofficial transcript and check for and correct any discrepancies
- Take the required standardized test

### Senior Year, Fall

- Write the first draft of your statement of purpose
- Request your letters of recommendation from faculty
- Order official transcripts
- Write final draft of statement of purpose
- Complete and submit your applications
- Apply for aid available through program, assistantships, fellowships, scholarships, etc.

### Senior Year, Spring

- Complete and submit financial aid applications
- Visit prospective campuses if possible and talk to faculty/students to help you make your final decision
- Follow-up with schools to make sure your file is complete
- After receiving acceptance from the school of your choice, send in the required deposit, and contact other schools to decline acceptances
- Write thank you notes to people who helped you

### Find More Information Online

- [www.career.ucla.edu](http://www.career.ucla.edu)
- [www.ets.org/gre](http://www.ets.org/gre)
- [www.fafsa.ed.gov](http://www.fafsa.ed.gov)
- [www.gradsource.com](http://www.gradsource.com)
- [www.gradschools.com](http://www.gradschools.com)
- [www.kaptest.com](http://www.kaptest.com)
- [www.petersons.com](http://www.petersons.com)
- [www.princetonreview.com](http://www.princetonreview.com)
- [www.usnews.com/best-graduate-schools](http://www.usnews.com/best-graduate-schools)



# RESEARCH OPPORTUNITIES AT UCLA

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## DIRECTED READING PROGRAM

[www.math.ucla.edu/~drp](http://www.math.ucla.edu/~drp)

The Directed Reading Program (DRP) pairs undergraduate students with graduate students for quarter-long independent study projects in mathematics. Projects culminate in a brief presentation given by the undergraduates in a DRP colloquium. Applicants are strongly recommended to have some familiarity with reading and writing mathematical proofs (e.g. MATH 115A, 131A).

## IPAM RESEARCH IN INDUSTRIAL PROJECTS FOR STUDENTS (RIPS)

[www.ipam.ucla.edu/programs/student-research-programs](http://www.ipam.ucla.edu/programs/student-research-programs)

RIPS is based on the successful Math Clinic concept that originated at Harvey Mudd College in 1973, as well as the Research Experience for Undergraduates (REU) program sponsored by the National Science Foundation (NSF). In the RIPS program, teams of students, directed by faculty advisors, work to solve industry-related problems. RIPS brings together highly qualified undergraduates in mathematics, or related majors, with sponsoring industry, government, and nonprofit organizations to collaborate on projects. Each team of three to four advanced students spends two summer months working on a problem posed by the sponsoring organization under the leadership of a faculty advisor. Projects focus on problems of serious interest to the sponsor and stimulating challenges to the students. Participation in RIPS provides valuable real-world technical and managerial experience for students and valuable R&D for the sponsor.

## NSF RESEARCH EDUCATION FOR UNDERGRADUATES (REU) PROGRAM

[www.math.ucla.edu/~bertozzi/WORKFORCE](http://www.math.ucla.edu/~bertozzi/WORKFORCE)

The REU program includes both individual research and group activities. Each student is assisted by a faculty advisor and some also by a graduate-student advisor. Group activities include seminars and other social and professional events. Students are encouraged to continue their research during the following academic year, under the direction of their summer mentor or another faculty member. Eligible students will receive a stipend for their work.

## UNDERGRADUATE RESEARCH PORTAL

[www.my.ucla.edu](http://www.my.ucla.edu)

You can search for research opportunities in all disciplines through the Research Portal in MyUCLA. When you log in, click on "Academics" and then "Undergraduate Research Portal".

## UNDERGRADUATE RESEARCH CENTER (URC)

[www.ugresearchsci.ucla.edu](http://www.ugresearchsci.ucla.edu)

The URC - Sciences serves students and faculty in all areas of life and physical sciences, engineering and mathematics. The primary mission is to promote, develop and celebrate undergraduate student research with the overall goal of enhancing undergraduate education and preparing students, including those from disadvantaged backgrounds, for academic and research careers. Research takes different forms in different disciplines. However, in all disciplines, research involves creative activities and meaningful research to produce results that are worthy of communication to others. Undergraduate research involves the close collaboration between a student and a faculty mentor, as well as other members of their research group.

Some of the programs that the URC runs through the school year and summer include, but are not limited to:

- Amgen Scholars Summer Program
- Biomedical Sciences Enrichment Program (BISEP)
- Bridges to UCLA for Community College Students
- CARE Fellows & Scholars Program
- CARE Science, Engineering & Math Summer Research Program
- Sustainable LA Grand Challenges Undergraduate Research Scholars Program
- i<sup>2</sup>URP (formerly HHURP)
- Maximizing Access to Research Careers (MARC) Program
- Student Research Program (SRP)
- UC Leadership Excellence through Advanced Degrees (UC LEADS)
- Undergraduate Research Fellows Program (URFP)
- Undergraduate Research Scholars Program (URSP)

## RESEARCH OPPORTUNITIES OFF CAMPUS

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While UCLA has many opportunities for undergraduate research, we also highly encourage students to take advantage of research opportunities from other institutions. Below are some examples of research opportunities outside of UCLA.

### **NATIONAL SCIENCE FOUNDATION (NSF) REU PROGRAMS**

[www.nsf.gov/crssprgm/reu](http://www.nsf.gov/crssprgm/reu)

NSF funds research and education in most fields of science and engineering. It does this through grants, and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the United States. The Foundation accounts for about one-fourth of federal support to academic institutions for basic research. The agency operates no laboratories itself but does support National Research Centers. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

### **SCIENCE UNDERGRADUATE LABORATORY INTERNSHIPS (SULI)**

<https://science.osti.gov/wdts/suli>

The SULI program encourages undergraduate students to pursue science, technology, engineering, and mathematics (STEM) careers by providing research experiences at the Department of Energy (DOE) laboratories. Selected students participate as interns appointed at one of 17 participating DOE facilities/laboratories. They perform research, under the guidance of laboratory staff scientists or engineers, on projects supporting the DOE mission. The SULI program is sponsored and managed by the DOE Office of Science's and Office of Workforce Development for Teachers and Scientists (WDTS) in collaboration with the DOE facilities/laboratories.

### **DIMACS REU: RESEARCH EXPERIENCE FOR UNDERGRADUATES AT RUTGERS UNIVERSITY**

<http://reu.dimacs.rutgers.edu/>

The Center for Discrete Mathematics & Theoretical Computer Science (DIMACS) was founded as one of 24 Science and Technology Centers funded by the NSF. It is located at Rutgers University, and is a joint project of Rutgers, Princeton, AT&T Laboratories, Applied Communication Sciences, NEC Laboratories America, and Nokia Bell Labs. Applicants should be undergraduates with a major in computer science, mathematics, or a closely related STEM field. They should be current juniors (graduating in the fall or spring immediately following the program), although sophomores with exceptionally strong backgrounds will be considered. Freshmen who have completed advanced course work in CS or math may apply, but they are very rarely accepted.

### **MATHPROGRAMS.ORG**

<https://www.mathprograms.org/db>

The MathPrograms service hosts a database of undergraduate summer research programs, small travel grant programs, and various other opportunities in mathematics at institutions across the nation.

### **SUMMER RESEARCH PROGRAMS OUTSIDE UCLA**

<http://www.ugresearchsci.ucla.edu/summerresearch.htm>

Summer is a great time to try research. There are hundreds of summer programs across the US. The Undergraduate Research Center maintains a list of clearinghouses for summer programs.

## CAREER OPPORTUNITIES

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Math can be found in almost every sector of the world of work. Students majoring in math should consider if they want to use math skills directly or indirectly in the workplace. This may determine the types of work experiences and further education necessary to prepare for an area of interest.

People with a math background may work in jobs with titles such as: analyst, research associate, technical consultant, computer scientist, or systems engineer.

Math majors develop many transferable skills, including critical thinking, problem diagnosis and solving, computer skills, and quantitative skills. Other important skills to develop include good reasoning, persistence, and written and verbal communication.

[www.career.ucla.edu](http://www.career.ucla.edu)

The UCLA Career Center offers services and resources to help UCLA students, UC graduates and employers reach their goals. As a UCLA student, from the first day you arrive, the Career Center can introduce you to an array of career possibilities and internships and help you explore the link between your major and career choices.

Handshake is a platform that the Career Center provides to connect students with internships, jobs and career opportunities. Handshake utilizes a user-friendly interface to help students find skill-specific jobs and internships, schedule appointments with undergraduate career educators or graduate career advisors, register for professional development events, career fairs and employer events.

[www.career.ucla.edu/handshake](http://www.career.ucla.edu/handshake)

## STUDENT ORGANIZATIONS

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### UCLA BRUIN ACTUARIAL SOCIETY (BAS)

The UCLA Bruin Actuarial Society is designated for those students interested in the actuarial profession. They serve as a support group for motivated students who plan on taking actuarial exams and want to find internships and jobs in the field. They are also dedicated to informing fellow Bruins who are interested in the actuarial field. During the last year, weekly e-mails were sent out to club members regarding company information sessions, internships, jobs, workshops, and scholarships.

[www.math.ucla.edu/~actuary](http://www.math.ucla.edu/~actuary) • [bruinactuaries@gmail.com](mailto:bruinactuaries@gmail.com)

### UNDERGRADUATE MATHEMATICS STUDENTS ASSOCIATION (UMSA)

The UCLA Undergraduate Mathematics Students Association is an officially recognized student group for all mathematics majors, and students of the other majors, who are interested in mathematics. UMSA was established in response to students' desire to have a connection to the Mathematics Department. The purpose of UMSA is to:

- Promote the academic awareness of the mathematics major
- Promotes better student-faculty relations
- Provide information on career opportunities in mathematics
- Provide a peer network in which students can discuss and further develop ideas and concepts that are presented in mathematics courses

[www.math.ucla.edu/~umsa](http://www.math.ucla.edu/~umsa) • [umsaatucla@gmail.com](mailto:umsaatucla@gmail.com)

### UCLA PI MU EPSILON (PME)

Pi Mu Epsilon, Inc., is the Honorary National Mathematics Society. Their purpose is "to promote scholarly activities in the mathematics among students, awareness of higher educational programs and career opportunities in mathematics, as well as social activities among its members." Current and future chapter projects include arranging popular talks on mathematical topics, a weekly problem-solving group, on-campus and off-campus community involvement (i.e., setting up high school competitions), and social activities.

[www.pme-math.org](http://www.pme-math.org) • [PMEinLA@gmail.com](mailto:PMEinLA@gmail.com)

# TEACHING PREPARATION PROGRAMS

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## Do you love mathematics? Do you like to explain mathematics concepts to others?

Imagine getting to develop a deep understanding of the mathematics you've learned and help young students every day of the work week! Teaching is a fun, creative, rewarding and challenging career that is well paid, with salaries starting at ~\$50K and peaking at ~\$100K for ten months of work. Further, because a significant portion of secondary mathematics teachers do not have strong mathematics backgrounds, mathematics majors who want to teach mathematics are in high demand. Recent data shows that even if every California (CA) mathematics major graduating next June chose to teach, more than half of the state's open secondary mathematics teaching positions would not be filled.

UCLA is one of the top California universities with graduates who go on to earn a CA mathematics teaching credential. Research shows that over 80% of UCLA mathematics graduates who go on to complete their teaching credential in the UCLA Teacher Education Program remain in teaching after 5 years. This is a stark contrast to the Los Angeles Unified School District average of 62%! In addition, evidence demonstrates that a significant fraction of UCLA mathematics department teacher preparation program graduates become mathematics teacher-leaders, increasing their impact on the mathematics education of local communities.

We encourage you to participate in our programs. We offer solid preparation for a career in teaching, a strong foundation for future leadership in the field, a cohort of colleagues to support you in the classroom, and dependent on funding, financial support toward your goals.

For general questions about UCLA Teaching Preparation Program, contact the undergraduate math advisor.

For additional questions or general inquiries about a career in teaching mathematics, contact the Curtis Center Executive Director, Heather Dallas — [dallas@math.ucla.edu](mailto:dallas@math.ucla.edu)

## UCLA CATEACH - MATH

UCLA California Teach - Math offers up to four years of courses, field experiences, credential preparation, and professional networking opportunities for undergraduates interested in teaching mathematics. In the program, mathematics professors, mathematics educators, and current mathematics teachers will work with you to provide you with the content and pedagogical content knowledge necessary to be a high quality mathematics teacher. Each year of the program includes mathematics courses, mathematics education courses, observation and participation in local schools, and credential preparation. Students may enroll in anywhere from one to all four years of the program, and those who complete all four years are thoroughly prepared for admission to a CA credential program.

[www.cateach.ucla.edu](http://www.cateach.ucla.edu)

## THE JOINT MATHEMATICS EDUCATION PROGRAM (JMPEP)

The Joint Math/Ed Program is a collaborative effort of the UCLA mathematics department and the Graduate School of Education's Teacher Education Program. In this program, students begin work toward a CA Preliminary Single Subject Teaching Credential in Mathematics and a Master of Education degree during their senior year. The program enables students to earn a full time salary (about \$40,000) while teaching full time in Los Angeles urban schools during the academic year immediately following their bachelor's degree.

<https://curtiscenter.math.ucla.edu/students/undergraduates/education-courses/math-for-la-finish-in-5-years-jmep/>

## SUBJECT MATTER PREPARATION PROGRAM (SMPP) FOR THE CA TEACHING CREDENTIAL

Applicants for a CA Preliminary Single Subject Teaching Credential in Mathematics must verify their "subject matter competence" to teach mathematics in one of two ways: 1.) Complete a CA-approved "subject matter program" and obtain verification of completion from the university with the approved program or 2.) Achieve a passing score on the three part California Subject Matter Examination for Teachers (CSET).

The UCLA Mathematics Department is a CA-approved "subject matter program" in mathematics. The program is comprised of mathematics courses, most of which are common to most mathematics majors, and the MATH 105ABC sequence. Students who complete the department's Mathematics for Teaching major will qualify for the department's CA-approved subject matter program. At the end of their senior year, students may request a letter from the Curtis Center's Executive Director's office verifying their completion of these courses and thus their subject matter competence for the CA Single Subject Teaching Credential in mathematics.

For more information and to apply, see the UCLA Curtis Center website.

<http://curtiscenter.math.ucla.edu/students/undergraduates/california-teaching-credential/>

# ACADEMIC YEAR PLANNER

## FIRST YEAR

| FALL         |  | WINTER       |  | SPRING       |  | SUMMER       |   |
|--------------|--|--------------|--|--------------|--|--------------|---|
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
| Total units: |  | Total units: |  | Total units: |  | Total units: | A |

## SECOND YEAR

| FALL         |  | WINTER       |  | SPRING       |  | SUMMER       |   |
|--------------|--|--------------|--|--------------|--|--------------|---|
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
| Total units: |  | Total units: |  | Total units: |  | Total units: | B |

## THIRD YEAR

| FALL         |  | WINTER       |  | SPRING       |  | SUMMER       |   |
|--------------|--|--------------|--|--------------|--|--------------|---|
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
| Total units: |  | Total units: |  | Total units: |  | Total units: | C |

## FOURTH YEAR

| FALL         |  | WINTER       |  | SPRING       |  | SUMMER       |   |
|--------------|--|--------------|--|--------------|--|--------------|---|
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
|              |  |              |  |              |  |              |   |
| Total units: |  | Total units: |  | Total units: |  | Total units: | D |

Overall upper division units: \_\_\_\_\_

*60.0/180.0 units must be upper division*

Overall units (A+B+C+D): \_\_\_\_\_

*180.0 units minimum*

# QUARTER COURSE PLANNER

|          | <b>MONDAY</b> | <b>TUESDAY</b> | <b>WEDNESDAY</b> | <b>THURSDAY</b> | <b>FRIDAY</b> |
|----------|---------------|----------------|------------------|-----------------|---------------|
| 8:00 AM  |               |                |                  |                 |               |
| 9:00 AM  |               |                |                  |                 |               |
| 10:00 AM |               |                |                  |                 |               |
| 11:00 AM |               |                |                  |                 |               |
| 12:00 PM |               |                |                  |                 |               |
| 1:00 PM  |               |                |                  |                 |               |
| 2:00 PM  |               |                |                  |                 |               |
| 3:00 PM  |               |                |                  |                 |               |
| 4:00 PM  |               |                |                  |                 |               |
| 5:00 PM  |               |                |                  |                 |               |
| 6:00 PM  |               |                |                  |                 |               |
| 7:00 PM  |               |                |                  |                 |               |