

# Mathematics, B.S.

The Department offers a B.S. in Mathematics. Within this program there are seven tracks; besides the standard track, there are six specializations or concentrations (in Mathematical Biology, Mathematical Finance, Data Science, Applied and Computational Mathematics, Mathematics for Education, and Mathematics for Education/Secondary Teaching Certification). In addition, the Department offers minors in Mathematics and Mathematics for Biology.

Undergraduate mathematics courses are of several kinds: courses preparatory to advanced work in mathematics, the exact sciences, and engineering; courses for students of the social and biological sciences; and courses for liberal arts students and those planning to enter the teaching field.

Students may be admitted to the Mathematics major upon entering the University as freshmen, via change of major, or as transfer students from other colleges and universities. Information about change of major policies is available in the Physical Sciences Student Affairs Office and at the UCI Change of Major Criteria website (<http://www.changeofmajor.uci.edu/>). For transfer student admission, preference will be given to junior-level applicants with the highest grades overall and who have satisfactorily completed the required coursework of one year of approved calculus. Additional course work in multivariable calculus, linear algebra, and differential equations is strongly recommended.

**All students must meet the University Requirements** (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

**School Requirements: None.**

## Core Requirements for all Mathematics Majors

### Lower-Division Requirements:

A. Complete the following:

MATH 2A- 2B	Single-Variable Calculus and Single-Variable Calculus
MATH 2D	Multivariable Calculus
MATH 3A	Introduction to Linear Algebra
MATH 3D	Elementary Differential Equations
MATH 13	Introduction to Abstract Mathematics

B. Computing skills:

MATH 9	Introduction to Programming for Numerical Analysis
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C. Select one three-quarter lecture course sequence from the following:

CHEM 1A- 1B- 1C	General Chemistry and General Chemistry and General Chemistry
PHYSICS 7C- 7D- 7E	Classical Physics and Classical Physics and Classical Physics
STATS 7-MATH 10-PHYSICS 7C	Basic Statistics and Introduction to Programming for Data Science and Classical Physics

### Upper-Division Requirements:

A. Complete:

MATH 120A	Introduction to Abstract Algebra: Groups
MATH 121A	Linear Algebra
MATH 130A	Probability I
MATH 140A- 140B	Elementary Analysis and Elementary Analysis

## Requirements for the Pure Mathematics Major

**Core requirements for all Mathematics majors plus:**

### Lower-Division Requirements:

A. Complete:

MATH 2E	Multivariable Calculus
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### Upper-Division Requirements:

A. Complete:

MATH 120B	Introduction to Abstract Algebra: Rings and Fields
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MATH 121B	Linear Algebra
MATH 147	Complex Analysis

B. Five additional four-unit MATH lecture courses numbered 100–189.

### Sample Program — Pure Mathematics

#### Freshman

Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
PHYSICS 7C- 7LC (or CHEM 1A)	PHYSICS 7D- 7LD (or CHEM 1B)	PHYSICS 7E or CHEM 1C
General Education/Elective	MATH 13	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

#### Sophomore

Fall	Winter	Spring
General Education/Elective	MATH 3A	MATH 3D
MATH 2E	MATH 9	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

#### Junior

Fall	Winter	Spring
MATH 130A	MATH 140A	MATH 140B
MATH 120A	MATH 120B	MATH 141
General Education/Elective	General Education/Elective	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

#### Senior

Fall	Winter	Spring
MATH 121A	MATH 121B	MATH 115
MATH 150	MATH 147	General Education/Elective
MATH 112A	MATH 180A	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

The Department offers two concentrations and three specializations. Note that all require the completion of an application and an interview with the faculty advisor for that concentration or specialization. **Admission into a concentration or specialization is not guaranteed.** Students must complete the basic 'Core' requirements for the B.S. in Mathematics along with the lower- and upper-division requirements specified for each concentration and specialization.

### Requirements for Mathematics Major with a Concentration in Data Science

Admission to this specialization requires approval in advance by the Mathematics Department. Students need a GPA of 3.0 in all lower-division and upper-division MATH courses to be admitted to the concentration and must maintain the GPA to remain and graduate in the concentration. The admissions process begins with completing a form at the Department office, and includes an interview with the Department's advisor for the specialization. This approval should be applied for no later than the end of the junior year.

#### Core requirements for all Mathematics majors plus:

##### Lower-Division Requirements:

A. Complete:

MATH 2E	Multivariable Calculus
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B. Replace item C in the Core Requirements with the following:

MATH 10	Introduction to Programming for Data Science
STATS 7	Basic Statistics
PHYSICS 7C	Classical Physics

##### Upper-Division Requirements

A. Complete:

MATH 105A- 105B	Numerical Analysis I and Numerical Analysis II
MATH 121B	Linear Algebra
MATH 130B	Probability II
MATH 110A- 110B	Optimization I and Optimization II
MATH 120B	Introduction to Abstract Algebra: Rings and Fields
MATH 147	Complex Analysis

B. Select three electives from the following: <sup>1</sup>

MATH 115	Mathematical Modeling
MATH 117	Dynamical Systems
MATH 118	The Theory of Differential Equations
MATH 130C	Stochastic Processes
MATH 133A- 133B or MATH 134A & MATH 134B	Statistical Methods with Applications to Finance and Statistical Methods with Applications to Finance Fixed Income and Mathematics of Financial Derivatives
MATH 140C	Analysis in Several Variables
MATH 162A- 162B	Introduction to Differential Geometry and Introduction to Differential Geometry
MATH 173A- 173B	Introduction to Cryptology and Introduction to Cryptology
MATH 175	Combinatorics
MATH 176	Mathematics of Finance
STATS 110	Statistical Methods for Data Analysis I
COMPSCI 171	Introduction to Artificial Intelligence
COMPSCI 172B	Neural Networks and Deep Learning
COMPSCI 177	Applications of Probability in Computer Science
COMPSCI 178	Machine Learning and Data-Mining
COMPSCI 179	Algorithms for Probabilistic and Deterministic Graphical Models
COMPSCI 183	Introduction to Computational Biology
COMPSCI 184A- 184C	Artificial Intelligence in Biology and Medicine and Computational Systems Biology
I&C SCI 105	Digital Information Systems

<sup>1</sup> At least one of the electives must be from outside the Mathematics department. Other upper-division elective courses may be chosen with the approval of the faculty advisor.

**Sample Program - Mathematics Major Concentrating in Data Science**

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 3A
STATS 7	PHYSICS 7C	MATH 9
Sophomore		
Fall	Winter	Spring
MATH 10	MATH 2D	MATH 2E
MATH 13		MATH 3D
Junior		
Fall	Winter	Spring
MATH 105A	MATH 105B	MATH 120A
MATH 121A	MATH 121B	
MATH 130A	MATH 130B	
Senior		
Fall	Winter	Spring
MATH 110A	MATH 110B	Upper-Division Elective
MATH 140A	MATH 140B	
Upper-Division Elective	Upper-Division Elective	

**Requirements for Mathematics Major with a Concentration in Mathematical Finance**

Admission to this concentration requires approval in advance by the Mathematics Department. Students need a GPA of 3.0 in university mathematics courses to be admitted to the concentration and must maintain the GPA to remain and graduate in the concentration. The department may limit the number of students admitted into this concentration during impacted years. The admissions process begins with completing a form at the Department office and includes an interview with the Department’s advisor for the concentration. This approval should be applied for after the student has completed ECON 20A-ECON 20B, but no later than the end of the junior year.

**Core requirements for all Mathematics majors plus:**

**Lower-Division Requirements:**

A. Complete:

MATH 2E Multivariable Calculus

B. Replace item C in the Core Requirements with the following:

MATH 10 Introduction to Programming for Data Science

STATS 7 Basic Statistics

PHYSICS 7C Classical Physics

**Upper-Division Requirements:**

A. Complete:

MATH 120B Introduction to Abstract Algebra: Rings and Fields

MATH 121B Linear Algebra

MATH 130B Probability II

MATH 130C Stochastic Processes

MATH 134A Fixed Income

MATH 134B Mathematics of Financial Derivatives

MATH 134C Mathematical Models for Finance

MATH 147 Complex Analysis

B. Select one elective lecture course from the following:

MATH 105A- 105B Numerical Analysis I and Numerical Analysis II (plus MATH 105LA-105LB)

MATH 110A Optimization I

MATH 173A Introduction to Cryptology

MATH 176 Mathematics of Finance

COMPSCI 171 Introduction to Artificial Intelligence

COMPSCI 172B Neural Networks and Deep Learning

COMPSCI 177 Applications of Probability in Computer Science

COMPSCI 178 Machine Learning and Data-Mining

C. Complete the following eight required Economics courses:

ECON 20A- 20B Basic Economics I and Basic Economics II

ECON 105A- 105B- 105C Intermediate Quantitative Economics I and Intermediate Quantitative Economics II and Intermediate Quantitative Economics III

ECON 122A Applied Econometrics I  
or ECON 123A Econometrics I

ECON 132A Introduction to Financial Investments

ECON 134A Corporate Finance  
or ECON 161A Money and Banking

**Sample Program — Mathematics Major Concentrating in Mathematical Finance**

**Freshman**

<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 2A	MATH 2B	MATH 2D
STATS 7	MATH 9	MATH 10
General Education/Elective	MATH 13	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

**Sophomore**

<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 2E	MATH 3A	MATH 3D
ECON 20A	ECON 20B	General Education/Elective
General Education/Elective	PHYSICS 7C	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

Junior		
Fall	Winter	Spring
MATH 130A	MATH 130B	MATH 130C
MATH 140A	MATH 140B	MATH 140C
ECON 105A	ECON 105B	ECON 105C
MATH 121A	MATH 121B	General Education/Elective
Senior		
Fall	Winter	Spring
MATH 134A	MATH 134B	MATH 134C
MATH 120A	MATH 176	MATH 121A
ECON 134A	ECON 132A	General Education/Elective
MATH 147	General Education/Elective	

## Requirements for Mathematics Major with a Specialization in Applied and Computational Mathematics

Admission to this specialization requires approval in advance by the Mathematics Department. The admissions process begins with completing a form at the Department office, and includes an interview with the Department's advisor for the specialization. This approval should be applied for no later than the end of the junior year.

### Core requirements for all Mathematics majors plus:

#### Lower-Division Requirements:

A. Complete:

MATH 2E	Multivariable Calculus
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#### Upper-Division Requirements:

A. Six required lecture courses:

MATH 105A- 105B	Numerical Analysis I and Numerical Analysis II (plus MATH 105LA-LB)
MATH 112A- 112B	Introduction to Partial Differential Equations and Applications and Introduction to Partial Differential Equations and Applications
MATH 115	Mathematical Modeling
MATH 121B	Linear Algebra

B. Select three additional Mathematics courses from the following:

MATH 107	Numerical Differential Equations (plus MATH 107L)
MATH 112C	Introduction to Partial Differential Equations and Applications
MATH 117	Dynamical Systems
MATH 118	The Theory of Differential Equations
MATH 130B- 130C	Probability II and Stochastic Processes
MATH 133A- 133B or MATH 134A & MATH 134B	Statistical Methods with Applications to Finance and Statistical Methods with Applications to Finance Fixed Income and Mathematics of Financial Derivatives
MATH 140C	Analysis in Several Variables
MATH 176	Mathematics of Finance

C. Two approved upper-division courses in an area of application outside of Mathematics. Approval must be obtained in advance from the advisor for this specialization. The student is responsible for satisfying any prerequisites for these courses.

## Sample Program — Mathematics Major Specializing in Applied and Computational Mathematics

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
PHYSICS 7C- 7LC (or CHEM 1A)	PHYSICS 7D- 7LD (or CHEM 1B)	PHYSICS 7E or CHEM 1C
General Education/Elective	General Education/Elective	MATH 13
General Education/Elective	General Education/Elective	General Education/Elective
Sophomore		
Fall	Winter	Spring
MATH 2E	MATH 3A	MATH 3D
MATH 9	General Education/Elective	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

General Education/Elective		General Education/Elective		General Education/Elective	
<b>Junior</b>					
<b>Fall</b>		<b>Winter</b>		<b>Spring</b>	
MATH 112A		MATH 112B		MATH 115	
MATH 121A		MATH 121B		MATH 140B	
MATH 130A		MATH 140A		General Education/Elective	
General Education/Elective		General Education/Elective		General Education/Elective	
<b>Senior</b>					
<b>Fall</b>		<b>Winter</b>		<b>Spring</b>	
MATH 105A- 105LA		MATH 105B- 105LB		MATH 107- 107L	
MATH 117		MATH 118		Technical Elective	
MATH 120A		Technical Elective		General Education/Elective	
General Education/Elective		General Education/Elective		General Education/Elective	

## Requirements for Mathematics Major with a Specialization in Mathematical Biology

Admission to this specialization requires approval in advance by the Mathematics Department. The admissions process begins with completing a form at the Department Office, and includes an interview with the Department's advisor for the specialization. This approval should be applied for no later than the end of the junior year.

### Core requirements for all Mathematics majors plus:

#### Lower-Division Requirements:

A. Complete:

MATH 2E	Multivariable Calculus
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B. Replace item C in the Core Requirements with the following:

BIO SCI 93	From DNA to Organisms
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BIO SCI 94	From Organisms to Ecosystems
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and two courses selected from the following:

BIO SCI 97	Genetics
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CHEM 1A	General Chemistry
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CHEM 1B	General Chemistry
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PHYSICS 2	Introduction to Mathematical Methods for Physics
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PHYSICS 7C	Classical Physics
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PHYSICS 7D	Classical Physics
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#### Upper-Division Requirements:

A. Complete the following seven required upper-division lecture courses:

MATH 105A- 105B	Numerical Analysis I and Numerical Analysis II (plus MATH 105LA-LB)
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MATH 112A- 112B	Introduction to Partial Differential Equations and Applications and Introduction to Partial Differential Equations and Applications
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MATH 113A- 113B	Mathematical Modeling in Biology and Mathematical Modeling in Biology
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MATH 115	Mathematical Modeling
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B. Two additional elective courses, at least one from MATH courses numbered 100–189. The second elective may be either an upper-division MATH course or a four-unit upper-division Biological Sciences course with the advanced approval by the advisor for this specialization.

### Sample Program — Mathematics Major Specializing in Mathematical Biology

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
BIO SCI 93	BIO SCI 94	MATH 13
General Education	General Education	General Education
General Education	General Education	General Education
Sophomore		
Fall	Winter	Spring
MATH 2E	MATH 3A	MATH 3D
CHEM 1A	CHEM 1B	General Education/Elective
MATH 9	General Education/Elective	General Education/Elective
General Education/Elective		

Junior		
Fall	Winter	Spring
MATH 113A	MATH 113B	MATH 115
MATH 105A- 105LA	MATH 105B- 105LB	MATH 121A
General Education/Elective	MATH 140A	MATH 140B
General Education/Elective	General Education/Elective	General Education/Elective
Senior		
Fall	Winter	Spring
MATH 112A	MATH 112B	MATH 115
MATH 130A	MATH 120A	MATH Elective
Bio. Elective	General Education/Elective	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective

### Requirements for Mathematics Major with a Specialization in Mathematics for Education

Admission to this specialization requires approval in advance by the Mathematics Department. The admission process begins with completing a form at the Department office, and includes an interview with the Department’s advisor for the specialization. This approval should be applied for no later than the end of the junior year.

This specialization is designed to help prepare students for teaching mathematics. Students wishing to go on and teach at the intermediate and high school levels should also consult with an academic advisor in the School of Education. A Commission on Teacher Credentialing (CTC)-approved subject-matter program (SMP) in Mathematics can be easily satisfied in tandem with this specialization, and enables students to waive a subject matter exam for teachers. Specific SMP requirements and enrollment procedures are available from the School of Education.

#### Core requirements for all Mathematics majors plus:

##### Lower-Division Requirements:

A. Complete:

MATH 8	Explorations in Functions and Modeling
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##### Upper-Division Requirements:

A. Complete:

MATH 105A- 105LA	Numerical Analysis I and Numerical Analysis Laboratory
MATH 120B	Introduction to Abstract Algebra: Rings and Fields
MATH 130B	Probability II
MATH 150	Introduction to Mathematical Logic
MATH 161	Modern Geometry
MATH 180A	Number Theory
MATH 184- 184L	History of Mathematics and History of Mathematics Lesson Lab

Plus one additional four-unit MATH course numbered 100–189.

B. Complete:

PHY SCI 5	California Teach 1: Introduction to Science and Mathematics Teaching
PHY SCI 105	California Teach 2: Middle School Science and Mathematics Teaching

#### Sample Program — Mathematics Major Specializing in Mathematics for Education

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
PHYSICS 7C- 7LC (or CHEM 1A)	PHYSICS 7D- 7LD (or CHEM 1B)	PHYSICS 7E or CHEM 1C
General Education	MATH 13	General Education
General Education/Elective	General Education	
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 8
PHY SCI 5	PHY SCI 105	MATH 121A
General Education	General Education	MATH 9
General Education		
Junior		
Fall	Winter	Spring
MATH 130A	MATH 130B	MATH 161

MATH 140A General Education	MATH 120A MATH 140B	MATH 120B General Education/Elective
<b>Senior</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 105A- 105LA	MATH 180A	MATH 184- 184L
MATH 150	General Education/Elective	General Education
General Education/Elective	Math. Elective	General Education

## Requirements for Mathematics Major with a Concentration in Mathematics for Education/Secondary Teaching Certification

Admission to this concentration requires approval in advance. The admission process begins with completing an Intent form at the Cal Teach Resource and Advising Center.

Following completion of the Intent form, students must complete an application in the Mathematics Department office and an interview with the Department's advisor for the concentration. These approvals should be applied for no later than the end of the sophomore year.

This concentration allows students pursuing the B.S. in Mathematics to earn a bachelor's degree and complete the required course work and field experience for a California Preliminary Single Subject Teaching Credential at the same time. With careful, early planning, it is possible for students to complete both in four years. For additional information about teacher certification requirements and enrollment procedures, see Preparation for Teaching Science and Mathematics (<http://catalogue.uci.edu/schoolofphysicalsciences/#undergraduateprogramstext>) or contact the Cal Teach Resource and Advising Center. A Commission on Teacher Credentialing (CTC)-approved subject-matter program (SMP) in Mathematics can be satisfied in tandem with this concentration, and enables students to waive a subject matter exam for teachers. Specific SMP requirements and enrollment procedures are available from the Cal Teach Resource and Advising Center or the School of Education.

### Core requirements for all Mathematics majors plus:

#### Lower-Division Requirements:

A. Complete:

MATH 8	Explorations in Functions and Modeling
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#### Upper-Division Requirements:

A. Complete:

MATH 105A- 105LA	Numerical Analysis I and Numerical Analysis Laboratory
MATH 120B	Introduction to Abstract Algebra: Rings and Fields
MATH 130B	Probability II
MATH 150	Introduction to Mathematical Logic
MATH 161	Modern Geometry
MATH 180A	Number Theory
MATH 184- 184L	History of Mathematics and History of Mathematics Lesson Lab

Plus one additional four-unit MATH course numbered 100–189.

B. Complete:

CHEM 193 or PHYSICS 193	Research Methods Research Methods
EDUC 55	Knowing and Learning in Mathematics and Science
EDUC 109	Reading and Writing in Mathematics and Science
EDUC 143AW	Classroom Interactions I
EDUC 143BW	Classroom Interactions II
EDUC 148	Complex Pedagogical Design
EDUC 158	Student Teaching Mathematics and Science in Middle/High School (two quarters)
PHY SCI 5	California Teach 1: Introduction to Science and Mathematics Teaching
PHY SCI 105	California Teach 2: Middle School Science and Mathematics Teaching

NOTE: Students may pursue either the concentration in Mathematics for Education/Secondary Teaching Certification or the specialization in Mathematics for Education, but not both.



**Sample Program - Concentration in Mathematics for Education/Secondary Teaching Certification**

<b>Freshman</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 2A	MATH 2B	MATH 2D
PHYSICS 7C- 7LC (or CHEM 1A)	PHYSICS 7D- 7LD (or CHEM 1B)	PHYSICS 7E or CHEM 1C
PHY SCI 5	MATH 13	MATH 8
General Education	General Education	MATH 9
<b>Sophomore</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 3A	MATH 3D	MATH 161
PHY SCI 105	MATH 180A	MATH 121A
General Education	CHEM 193	General Education
<b>Junior</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 130A	MATH 130B	MATH 184- 184L
MATH 140A	MATH 120A	MATH 120B
EDUC 55	MATH 140B	EDUC 148
	EDUC 143AW	Math. Elective
<b>Senior</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
MATH 105A- 105LA	EDUC 109	EDUC 158
MATH 150	EDUC 158	General Education
EDUC 143BW	General Education	General Education

The Honors Program in Mathematics is designed for students contemplating graduate work in mathematics. The program is open to junior and senior Mathematics majors who meet the minimum academic qualifications of a 3.5 GPA in Mathematics courses and a 3.2 GPA overall. It is highly recommended that students meet with the Honors Advisor by the beginning of their junior year to begin planning courses. Students should officially apply for the Honors Program no later than the Fall quarter of their senior year. Recognition for completing the program is conferred upon graduation.

Participants must meet the following requirements:

A. Complete the requirements for the major in Mathematics (in any one of its tracks)

B. Complete:

MATH 120B	Introduction to Abstract Algebra: Rings and Fields
MATH 121B	Linear Algebra

C. Complete one of the following series:

MATH H140A	Honors Introduction to Graduate Analysis I
MATH H140B	Honors Introduction to Graduate Analysis II
MATH H140C	Honors Introduction to Graduate Analysis III
or	
MATH H120A	Honors Introduction to Graduate Algebra I
MATH H120B	Honors Introduction to Graduate Algebra II
MATH H120C	Honors Introduction to Graduate Algebra III
or	
(MATH 120C or MATH 140C) and MATH 133A - MATH 133B	
or	
(MATH 120C or MATH 140C) and MATH 180A - MATH 180B	
or	
(MATH 120C or MATH 140C) and MATH 113A - MATH 113B	
or	
(MATH 120C or MATH 140C) and MATH 162A - MATH 162B	

D. Complete one quarter of Math 199, or a research project and thesis approved by the Honors Program Advisor.

These requirements are in addition to the Mathematics major requirements and the requirements for any specialization/concentration. However, MATH H120A-MATH H120B-MATH H120C in item C may be used to satisfy upper-division electives or taken in place of MATH 120A-MATH 120B-MATH 120C and MATH 121A-MATH 121B. Similarly, MATH H140A-MATH H140B-MATH H140C may be used to satisfy upper-division electives or taken in place of MATH 140A-MATH 140B-MATH 140C and MATH 141.

NOTE: If all requirements are completed and the student's work and final GPA satisfies the program restrictions, the student will graduate with Honors in Mathematics, and this distinction is noted on the transcript.

## Sample Program — Mathematics Major Honors Program

Freshman		
Fall	Winter	Spring
MATH 2B	MATH 2D	MATH 2E
PHYSICS 7C- 7LC (or CHEM 1A)	PHYSICS 7D- 7LD (or CHEM 1B)	PHYSICS 7E or CHEM 1C
General Education/Elective	MATH 13	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 121B
General Education/Elective	MATH 121A	General Education/Elective
General Education/Elective	MATH 9	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective
Junior		
Fall	Winter	Spring
MATH H120A	MATH H120B	MATH H120C
MATH H140A	MATH H140B	MATH H140C
MATH 130A	MATH 147	General Education/Elective
General Education/Elective	General Education/Elective	General Education/Elective
Senior		
Fall	Winter	Spring
MATH 150	MATH 162A	MATH 162B
General Education/Elective	MATH 199	General Education/Elective
		MATH 199

In order to prepare for independent study/independent research, it is highly recommended that students take at least one course sequence in the field they are interested in studying. The following list contains the major mathematical disciplines and the course work suggested for completion prior to doing independent study in that field:

- Applied Mathematics: MATH 117 and MATH 118
- Algebra: MATH 120A-MATH 120B-MATH 120C
- Probability and Statistics: MATH 130A-MATH 130B-MATH 130C
- Analysis: MATH 140A-MATH 140B-MATH 140C
- Logic: MATH 150
- Geometry: MATH 162A-MATH 162B
- Number Theory: MATH 180A-MATH 180B

For all Mathematics majors, or prospective majors, assistance in planning a program of study is available from the School of Physical Sciences academic counselors, as well as from the Mathematics Department Undergraduate Advisor for the various tracks. The application process for the specializations and concentrations requires students to plan a program of study with the assistance of a faculty advisor (<https://www.math.uci.edu/undergraduate-studies/concentrations-and-specializations>).

Those in the specialization for Education should note that MATH 184 may not be offered more than once every other year and thus should be taken when offered.