Department of Mathematics

Karl Rubin, Department Chair
340 Rowland Hall
949-824-5503
http://www.math.uci.edu/

Overview

The Department of Mathematics is engaged in teaching and in fundamental research in a wide variety of basic mathematical disciplines, and offers undergraduate and graduate students the opportunity to fashion a thorough program of study leading to professional competence in mathematical research or in an area of application.

The curriculum in mathematics includes opportunities for supervised individual study and research and is augmented by seminars and colloquia. It is designed to be compatible with curricular structures at other collegiate institutions in California in order to enable students transferring to UCI to continue their programs of mathematics study.

Undergraduate Program

The Department offers a B.S. in Mathematics. Within this program there are six tracks; besides the standard track, there are five specializations or concentrations (in Mathematical Biology, Mathematical Finance, 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.

Admission to the Major

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.

Requirements for the B.S. in Mathematics (including Concentrations and Specializations)

All students must meet the University Requirements. School Requirements: None.

Core Requirements for all Mathematics Majors

Lower-Division Requirements:

<table>
<thead>
<tr>
<th>A. Complete the following:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2A- 2B</td>
<td>Single-Variable Calculus and Single-Variable Calculus</td>
</tr>
<tr>
<td>MATH 2D</td>
<td>Multivariable Calculus</td>
</tr>
<tr>
<td>MATH 3A</td>
<td>Introduction to Linear Algebra</td>
</tr>
<tr>
<td>MATH 3D</td>
<td>Elementary Differential Equations</td>
</tr>
<tr>
<td>MATH 13</td>
<td>Introduction to Abstract Mathematics</td>
</tr>
<tr>
<td>B. Computing skills:</td>
<td></td>
</tr>
<tr>
<td>MATH 9</td>
<td>Introduction to Programming for Numerical Analysis</td>
</tr>
<tr>
<td>C. Select one three-quarter lecture course sequence from the following:</td>
<td></td>
</tr>
<tr>
<td>CHEM 1A- 1B- 1C</td>
<td>General Chemistry and General Chemistry</td>
</tr>
<tr>
<td>PHYSICS 2- 7C- 7D</td>
<td>Introduction to Mathematical Methods for Physics and Classical Physics</td>
</tr>
<tr>
<td>PHYSICS 2- 7C- 7E</td>
<td>Introduction to Mathematical Methods for Physics and Classical Physics</td>
</tr>
<tr>
<td>PHYSICS 7C- 7D- 7E</td>
<td>Classical Physics and Classical Physics</td>
</tr>
</tbody>
</table>

UCI General Catalogue 2017-2018
## Upper-Division Requirements:

A. Complete:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 120A</td>
<td>Introduction to Abstract Algebra: Groups</td>
</tr>
<tr>
<td>MATH 121A</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH 130A</td>
<td>Probability and Stochastic Processes</td>
</tr>
<tr>
<td>MATH 140A-140B</td>
<td>Elementary Analysis and Elementary Analysis</td>
</tr>
</tbody>
</table>

## Requirements for the Pure Mathematics Major

Core requirements for all Mathematics majors plus:

### Lower-Division Requirements:

A. Complete:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2E</td>
<td>Multivariable Calculus</td>
</tr>
</tbody>
</table>

### Upper-Division Requirements:

A. Complete:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 120B</td>
<td>Introduction to Abstract Algebra: Rings and Fields</td>
</tr>
<tr>
<td>MATH 121B</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH 147</td>
<td>Complex Analysis</td>
</tr>
</tbody>
</table>

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

### Sample Program — Pure Mathematics

#### Freshman

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH 2A</td>
<td>MATH 2B</td>
<td>MATH 2D</td>
</tr>
<tr>
<td></td>
<td>PHYSICS 2</td>
<td>PHYSICS 7C-7LC</td>
<td>PHYSICS 7D-7LD</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>MATH 13</td>
<td>General Education/Elective</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

#### Sophomore

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Education/Elective</td>
<td>MATH 3A</td>
<td>MATH 3D</td>
</tr>
<tr>
<td></td>
<td>MATH 2E</td>
<td>MATH 9</td>
<td>General Education/Elective</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

#### Junior

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH 130A</td>
<td>MATH 140A</td>
<td>MATH 140B</td>
</tr>
<tr>
<td></td>
<td>MATH 120A</td>
<td>MATH 120B</td>
<td>MATH 141</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

#### Senior

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH 121A</td>
<td>MATH 121B</td>
<td>MATH 115</td>
</tr>
<tr>
<td></td>
<td>MATH 150</td>
<td>MATH 147</td>
<td>General Education/Elective</td>
</tr>
<tr>
<td></td>
<td>MATH 112A</td>
<td>MATH 180A</td>
<td>General Education/Elective</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

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. 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 Mathematical Finance

Admission to this concentration 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 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

Upper-Division Requirements:

A. Complete:
MATH 130B  Probability and Stochastic Processes
MATH 133A  Statistical Methods with Applications to Finance
MATH 133B  Statistical Methods with Applications to Finance

B. Select three elective lecture courses from the following:
MATH 105A-105B  Numerical Analysis and Numerical Analysis (plus MATH 105LA-105LB)
MATH 107  Numerical Differential Equations (plus MATH 107L)
MATH 112A-112B-112C  Introduction to Partial Differential Equations and Applications and Introduction to Partial Differential Equations and Applications and Introduction to Partial Differential Equations and Applications
MATH 115  Mathematical Modeling
MATH 117  Dynamical Systems
MATH 118  The Theory of Differential Equations
MATH 121B  Linear Algebra
MATH 130C  Probability and Stochastic Processes
MATH 133C  Statistical Methods with Applications to Finance
MATH 140C  Analysis in Several Variables
MATH 176  Mathematics of Finance

C. Complete the following eight required Economics courses:
ECON 20A-20B  Basic Economics I and Basic Economics II
ECON 122A  Applied Econometrics I
or ECON 123A  Econometrics I
ECON 132A  Introduction to Financial Investments
ECON 134A  Corporate Finance

Sample Program — Mathematics Major Concentrating in Mathematical Finance

Freshman
 Fall  Winter  Spring
MATH 2A  MATH 2B  MATH 2D
PHYSICS 2  PHYSICS 7C-7LC  PHYSICS 7D-7LD
General Education/Elective  MATH 13  General Education/Elective
General Education/Elective  General Education/Elective  General Education/Elective

Sophomore
 Fall  Winter  Spring
MATH 2E  MATH 3A  MATH 3D
ECON 20A  ECON 20B  General Education/Elective
General Education/Elective  MATH 9  General Education/Elective
General Education/Elective  General Education/Elective

Junior
 Fall  Winter  Spring
MATH 130A  MATH 130B  ECON 122A
MATH 140A  MATH 140B  MATH 140C
ECON 105A  ECON 105B  ECON 105C
General Education/Elective  General Education/Elective  General Education/Elective

Senior
 Fall  Winter  Spring
MATH 120A  MATH 133A  MATH 133B
MATH 118  MATH 176  MATH 115
ECON 134A  ECON 132A  MATH 121A
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

Upper-Division Requirements:
A. Six required lecture courses:
MATH 105A- 105B  Numerical Analysis and Numerical Analysis (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 and Stochastic Processes and Probability and Stochastic Processes
MATH 133A- 133B  Statistical Methods with Applications to Finance and Statistical Methods with Applications to Finance
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
MATH 2A
PHYSICS 2
General Education/Elective
General Education/Elective
Winter
MATH 2B
PHYSICS 7C- 7LC
General Education/Elective
General Education/Elective
Spring
MATH 13
PHYSICS 7D- 7LD
General Education/Elective
General Education/Elective

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

Junior
Fall
MATH 112A
MATH 121A
MATH 130A
General Education/Elective
Winter
MATH 112B
MATH 121B
MATH 140A
General Education/Elective
Spring
MATH 115
MATH 140B
General Education/Elective

Senior
Fall
MATH 105A- 105LA
MATH 117
MATH 120A
Winter
MATH 105B- 105LB
MATH 118
Technical Elective
Spring
MATH 107- 107L
Technical 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
B. Replace item C in the Core Requirements with the following:
   BIO SCI 93 From DNA to Organisms
   BIO SCI 94 From Organisms to Ecosystems
   and two courses selected from the following:
   BIO SCI 97 Genetics
   CHEM 1A General Chemistry
   CHEM 1B General Chemistry
   PHYSICS 2 Introduction to Mathematical Methods for Physics
   PHYSICS 7C Classical Physics
   PHYSICS 7D Classical Physics

Upper-Division Requirements:
A. Complete the following seven required upper-division lecture courses:
   MATH 105A-105B Numerical Analysis
   and Numerical Analysis (plus MATH 105LA-LB)
   MATH 112A-112B Introduction to Partial Differential Equations and Applications
   and Introduction to Partial Differential Equations and Applications
   MATH 113A-113B Mathematical Modeling in Biology
   and Mathematical Modeling in Biology
   MATH 115 Mathematical Modeling

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

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2A</td>
<td>MATH 2B</td>
<td>MATH 13</td>
<td></td>
</tr>
<tr>
<td>BIO SCI 93</td>
<td>BIO SCI 94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
<td>General Education</td>
<td></td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2E</td>
<td>MATH 3A</td>
<td>MATH 3D</td>
<td></td>
</tr>
<tr>
<td>CHEM 1A</td>
<td>CHEM 1B</td>
<td>General Education/Elective</td>
<td></td>
</tr>
<tr>
<td>MATH 9</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 113A</td>
<td>MATH 113B</td>
<td>MATH 115</td>
<td></td>
</tr>
<tr>
<td>MATH 105A-105LA</td>
<td>MATH 105B-105LB</td>
<td>MATH 121A</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>MATH 140A</td>
<td>MATH 140B</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 112A</td>
<td>MATH 112B</td>
<td>MATH 115</td>
<td></td>
</tr>
<tr>
<td>MATH 130A</td>
<td>MATH 120A</td>
<td>MATH Elective</td>
<td></td>
</tr>
<tr>
<td>Bio. Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td></td>
</tr>
</tbody>
</table>
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

Upper-Division Requirements:
A. Complete:
MATH 105A-105LA Numerical Analysis and Numerical Analysis Laboratory
MATH 120B Introduction to Abstract Algebra: Rings and Fields
MATH 130B Probability and Stochastic Processes
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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>MATH 2A</td>
<td>MATH 2B</td>
<td>MATH 2D</td>
</tr>
<tr>
<td></td>
<td>PHYSICS 2</td>
<td>PHYSICS 7C-7LC</td>
<td>PHYSICS 7D-7LD</td>
</tr>
<tr>
<td></td>
<td>General Education</td>
<td>MATH 13</td>
<td>General Education</td>
</tr>
<tr>
<td></td>
<td>General Education/Elective</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>Sophomore</td>
<td>MATH 3A</td>
<td>MATH 3D</td>
<td>MATH 8</td>
</tr>
<tr>
<td></td>
<td>PHY SCI 5</td>
<td>PHY SCI 105</td>
<td>MATH 121A</td>
</tr>
<tr>
<td></td>
<td>General Education</td>
<td>General Education</td>
<td>MATH 9</td>
</tr>
<tr>
<td></td>
<td>General Education</td>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>Junior</td>
<td>MATH 130A</td>
<td>MATH 130B</td>
<td>MATH 161</td>
</tr>
<tr>
<td></td>
<td>MATH 140A</td>
<td>MATH 120A</td>
<td>MATH 120B</td>
</tr>
<tr>
<td></td>
<td>General Education</td>
<td>MATH 140B</td>
<td>General Education/Elective</td>
</tr>
<tr>
<td>Senior</td>
<td>MATH 105A-105LA</td>
<td>MATH 180A</td>
<td>MATH 184-184L</td>
</tr>
<tr>
<td></td>
<td>MATH 150</td>
<td>General Education/Elective</td>
<td>General Education</td>
</tr>
<tr>
<td></td>
<td>General Education/Elective</td>
<td>Math. Elective</td>
<td>General Education</td>
</tr>
</tbody>
</table>
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 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

Upper-Division Requirements:
A. Complete:
MATH 105A-105LA Numerical Analysis and Numerical Analysis Laboratory
MATH 120B Introduction to Abstract Algebra: Rings and Fields
MATH 130B Probability and Stochastic Processes
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 Research Methods
or PHYSICS 193 Research Methods
EDUC 55 Knowing and Learning in Mathematics and Science
EDUC 109 Reading and Writing in Secondary Mathematics and Science Classrooms
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

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 2A</td>
<td>MATH 2B</td>
<td>MATH 2D</td>
</tr>
<tr>
<td>PHYSICS 2</td>
<td>PHYSICS 7C-7LC</td>
<td>PHYSICS 7D-7LD</td>
</tr>
<tr>
<td>PHY SCI 5</td>
<td>MATH 13</td>
<td>MATH 8</td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
<td>MATH 9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 3A</td>
<td>MATH 3D</td>
<td>MATH 161</td>
</tr>
</tbody>
</table>
### Additional Information

**Honors Program in Mathematics**

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 and 121B

C. Complete one of the following series:

   - MATH H140A
   - MATH H140B
   - MATH H140C
   - or
   - MATH H120A
   - MATH H120B
   - MATH H120C
   - 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

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 2B</td>
<td>MATH 2D</td>
<td>MATH 2E</td>
</tr>
<tr>
<td>PHYSICS 2</td>
<td>PHYSICS 7C-7LC</td>
<td>PHYSICS 7D-7LD</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>MATH 13</td>
<td>General Education/Elective</td>
</tr>
<tr>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
<td>General Education/Elective</td>
</tr>
</tbody>
</table>
Research in Mathematics

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

Planning a Program of Study

For all Mathematics majors, or prospective majors, assistance in planning a program of study is available from the Mathematics Department Undergraduate Advisor and the advisors for the various tracks, as well as from the academic counselors for the School of Physical Sciences. The application process for the specializations and concentrations requires students to plan a program of study with the assistance of a faculty advisor. The following sample programs are only examples.

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.

Requirements for the Minor in Mathematics

A. Complete:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 13</td>
<td>Introduction to Abstract Mathematics</td>
</tr>
<tr>
<td>MATH 120A</td>
<td>Introduction to Abstract Algebra: Groups</td>
</tr>
<tr>
<td>or MATH 140A</td>
<td>Elementary Analysis</td>
</tr>
</tbody>
</table>

B. Select five additional four-unit courses in MATH (plus the associated lab, where applicable) numbered 77–189.

NOTE: Nearly all upper-division courses in Mathematics have MATH 2A-MATH 2B as prerequisites, and many courses have additional prerequisites such as MATH 2D, MATH 2E, MATH 3A, and/or MATH 3D.

Requirements for the Minor in Mathematics for Biology

A. Complete:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 13</td>
<td>Introduction to Abstract Mathematics</td>
</tr>
<tr>
<td>MATH 113A-113B</td>
<td>Mathematical Modeling in Biology and Mathematical Modeling in Biology</td>
</tr>
</tbody>
</table>

B. Select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 105A</td>
<td>Numerical Analysis (plus MATH 105LA)</td>
</tr>
<tr>
<td>MATH 112A</td>
<td>Introduction to Partial Differential Equations and Applications</td>
</tr>
</tbody>
</table>
MATH 117  Dynamical Systems
MATH 118  The Theory of Differential Equations
MATH 121A  Linear Algebra
MATH 140A  Elementary Analysis

C. One additional four-unit upper-division lecture course in MATH numbered 100–189.

NOTE: Nearly all upper-division courses in Mathematics have MATH 2A-MATH 2B as prerequisites, and many courses have additional prerequisites such as MATH 2D, MATH 2E, MATH 3A, and/or MATH 3D.

**Graduate Program**

Graduate courses are designed to meet the needs of students doing graduate work in mathematics and in those disciplines that require graduate-level mathematics for their study. Among the fields covered are analysis, algebra, applied and computational mathematics, mathematical biology, geometry and topology, probability, ordinary and partial differential equations, and mathematical logic.

In addition to formal courses, there are seminars for advanced study toward the Ph.D. in various fields of mathematics. Topics will vary from year to year. Each seminar is conducted by a faculty member specializing in the subject studied. Enrollment will be subject to the approval of the instructor in charge.

**Master of Science in Mathematics**

To earn the Master of Science degree, the student must satisfy course and residency requirements, and achieve two passes at the M.S. level among three exams in Real Analysis, Complex Analysis, and Algebra prior to the beginning of the second year.

**Requirements**

The total number of required courses for the M.S. is 12, completed with satisfactory performance, that is, with a grade of B or better. Students are required to complete at least one series of the following courses:

- **MATH 210A- 210B- 210C** Real Analysis and Real Analysis and Real Analysis
- or
- **MATH 220A- 220B- 220C** Analytic Function Theory and Analytic Function Theory and Analytic Function Theory
- or
- **MATH 230A- 230B- 230C** Algebra and Algebra and Algebra

At most one undergraduate course may count as an elective course, provided it is sponsored by rank faculty and approved by the Graduate Advisor. At most one elective course (at least three units) is allowed outside the Department.

To satisfy exam requirements, students may take the Core Assessment Exam (offered in the spring of every year), the Comprehensive Exams (offered in the spring of every year), or the Qualifying Exams (offered before the start of each fall quarter) in Real Analysis, Complex Analysis, and Algebra. Students may not attempt to pass an exam in any particular area more than three times. Some students may require additional background before entering MATH 210 or MATH 230. This will be determined by assessment prior to the start of the students' first year by the Vice Chair of Graduate Studies, upon consultation with the Graduate Studies Committee. Such students will be directed into MATH 205 and/or MATH 206 during their first year. They may pass one Comprehensive Exam in the areas of Analysis or Algebra in lieu of achieving an M.S. pass in one of the Core Assessment or Qualifying Exams that must be obtained prior to the start of their second year.

Students who fail to pass the required examinations satisfactorily within the period specified will be recommended for academic disqualification by the Graduate Dean.

MATH 199, MATH 297, MATH 298, MATH 299, and may not be used to fulfill course requirements.

The residency requirement ordinarily is satisfied by full-time enrollment for three quarters immediately preceding the award of the M.S. When appropriate, a leave of absence may be granted between matriculation and the final quarters of study.

If the candidate is not advanced before the beginning of the quarter in which all requirements are completed, the degree will not be conferred until the end of the following quarter. Deadlines for submission of the Application for Advancement to Candidacy are published on the Graduate Division website (http://www.grad.uci.edu/academics/filing%20deadlines) under filing fees and deadlines.
Advancement to M.S. Candidacy

All Master’s students must be advanced to candidacy for the degree prior to the beginning of their final quarter of enrollment. An application for Advancement to Candidacy must be completed by the student and submitted for approval to the Department. The approved application must be submitted to the Graduate Division by the deadline published on the Graduate Division website (http://www.grad.uci.edu). Advancement to M.S. Candidacy must occur one quarter prior to the degree conferral quarter.

Filing fee information can be located on the Graduate Division website (http://www.grad.uci.edu).

Master of Science in Mathematics with a Teaching Credential

In cooperation with the UCI School of Education, the Department of Mathematics sponsors a coordinated program for the M.S. degree in Mathematics and the California Single Subject Teaching Credential. The requirements for this option are the same as the Master of Science in Mathematics requirements listed above.

The student will complete the requirements for the Master’s degree with the Mathematics Department (generally a two-year commitment) and then will petition with the UCI School of Education to take the School of Education’s credential courses (generally a one-year commitment). The student must meet the requirements of the School of Education for the CBEST, CSET, TB test, and Certificate of Clearance. Prospective graduate students interested in this program should so indicate on their applications. A detailed description of the program can be requested from the School of Education.

Doctor of Philosophy in Mathematics

When accepted into the doctoral program, the student embarks on a program of formal courses, seminars, and individual study courses to prepare for the Ph.D. written examinations, Advancement to Candidacy examination, and dissertation.

Requirements

Upon entering the program, students are expected to take MATH 210A, MATH 210B, MATH 210C, MATH 220A, MATH 220B, MATH 220C, MATH 230A, MATH 230B, and MATH 230C, which must be passed with a grade of B or better. Students must complete these sequences by the end of the second year.

By the start of the second year, students must achieve at least two passes at the M.S. level among three exams in Real Analysis, Complex Analysis, and Algebra. By the start of the third year, students must achieve two Ph.D. level passes among three exams in Real Analysis, Complex Analysis, and Algebra.

To satisfy the exam requirements, students may take the Core Assessment Exams (offered in spring of every year) or the Qualifying Exams (offered before the start of the fall quarter) in these areas. Students may not attempt to take an exam in a particular subject area more than three times. A student who passes a Qualifying Examination at the Ph.D. level prior to taking the corresponding course will be exempted from taking the course.

Some students may require additional background prior to entering MATH 210A, MATH 210B, MATH 210C, MATH 230A, MATH 230B, and MATH 230C. This will be determined by assessment prior to the start of the students’ first year by the Vice Chair for Graduate Studies, upon consultation with the Graduate Studies Committee. Such students will be directed into MATH 205 and/or MATH 206, or equivalent, during their first year. These students may pass one Comprehensive Exam in the areas of Algebra or Analysis in lieu of achieving an M.S. pass on one Core Assessment or Qualifying Exam that must be obtained prior to the start of the students’ second year. Comprehensive Exams in Analysis and Algebra will be offered once per year in the spring quarter.

By the end of their second year, students must declare a major specialization from the following areas: Algebra, Analysis, Applied and Computational Mathematics, Geometry and Topology, Logic, or Probability. Students are required to take two series of courses from their chosen area. (Students who later decide to change their area must also take two series of courses from the new area.) Additionally, all students must take two series outside their declared major area of specialization. Special topics courses within certain areas of specialization and courses counted toward the M.S., other than MATH 205A-MATH 205B-MATH 205C and MATH 206A-MATH 206B-MATH 206C, will count toward the fulfillment of the major specialization requirement.

By the beginning of their third year, students must have an advisor specializing in their major area. With the advisor’s aid, the student forms a committee for the Advancement to Candidacy oral examination. This committee will be approved by the Department on behalf of the Dean of the Graduate Division and the Graduate Council and will consist of five faculty members. At least one, and at most two, of the members must be faculty outside from the Department. Before the end of the third year, students must have a written proposal, approved by their committee, for the Advancement to Candidacy examination. The proposal should explain the role of at least two series of courses from the student’s major area of specialization that will be used to satisfy the Advancement to Candidacy requirements. The proposal should also explain the role of additional research reading material as well as providing a plan for investigating specific topics under the direction of the student’s advisor(s). Only one of the courses MATH 210A-MATH 210B-MATH 210C, MATH 220A-MATH 220B-MATH 220C, and MATH 230A-MATH 230B-MATH 230C may count for the course requirement for Advancement to Candidacy Examinations. After the student meets the requirements, the Graduate Studies Committee recommends to the Dean of the Graduate Division the advancement to candidacy for the Ph.D. Students should advance to candidacy by the beginning of their fourth year.
After advancing to candidacy, students are expected to be fully involved in research toward writing their Ph.D. dissertation. Ideally, students should keep in steady contact/interaction with their Doctoral Committee.

Teaching experience and training is an integral part of the Ph.D. program. All doctoral students are expected to participate in the Department’s teaching program.

The candidate must demonstrate independent, creative research in Mathematics by writing and defending a dissertation that makes a new and valuable contribution to mathematics in the candidate’s area of concentration. Upon Advancement to Candidacy a student must form a Thesis Committee, a subcommittee of the Advancement Examination Committee, consisting of at least three faculty members and chaired by the student’s advisor. The committee guides and supervises the candidate’s research, study, and writing of the dissertation; conducts an oral defense of the dissertation; and recommends that the Ph.D. be conferred upon approval of the Doctoral Dissertation. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years. Completion of the Ph.D. degree must occur within nine quarters of Advancement to Ph.D. candidacy.

Examinations

Ph.D. examinations are given in Algebra, Complex Analysis, and Real Analysis. All students seeking the Ph.D. must successfully complete two examinations before the end of the third year of entering the graduate program. Only two attempts are allowed for a Ph.D. student on each exam.

Area Requirements

Ph.D. students will choose from one of six areas of specialization in the Mathematics Department, which determines course work requirements. Each area of specialization will have a core course, which the Department will do its best to offer each year. The Department will offer other courses every other year, or more frequently depending on student demands and other Department priorities.

### Algebra

<table>
<thead>
<tr>
<th>MATH 230A- 230B- 230C</th>
<th>Algebra and Algebra (core)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 232A- 232B- 232C</td>
<td>Algebraic Number Theory and Algebraic Number Theory</td>
</tr>
<tr>
<td>MATH 233A- 233B- 233C</td>
<td>Algebraic Geometry and Algebraic Geometry</td>
</tr>
<tr>
<td>MATH 234B- 234C</td>
<td>Topics in Algebra and Topics in Algebra</td>
</tr>
<tr>
<td>MATH 235A- 235B- 235C</td>
<td>Mathematics of Cryptography and Mathematics of Cryptography</td>
</tr>
</tbody>
</table>

### Analysis

<table>
<thead>
<tr>
<th>MATH 210A- 210B- 210C</th>
<th>Real Analysis and Real Analysis (core)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 211A- 211B- 211C</td>
<td>Topics in Analysis and Topics in Analysis</td>
</tr>
<tr>
<td>MATH 220A- 220B- 220C</td>
<td>Analytic Function Theory and Analytic Function Theory (core)</td>
</tr>
</tbody>
</table>

### Applied and Computational Mathematics

<p>| MATH 296 | Topics in Partial Differential Equations |</p>
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 227A- 227B</td>
<td>Mathematical and Computational Biology and Mathematical and Computational Biology</td>
</tr>
<tr>
<td>MATH 291C</td>
<td>Topics in Applied and Computational Math</td>
</tr>
<tr>
<td><strong>Geometry and Topology</strong></td>
<td></td>
</tr>
<tr>
<td>MATH 218A- 218B- 218C</td>
<td>Introduction to Manifolds and Geometry and Introduction to Manifolds and Geometry and Introduction to Manifolds and Geometry (core)</td>
</tr>
<tr>
<td>MATH 222A- 222B- 222C</td>
<td>Several Complex Variables and Complex Geometry and Several Complex Variables and Complex Geometry and Several Complex Variables and Complex Geometry</td>
</tr>
<tr>
<td>MATH 240A- 240B- 240C</td>
<td>Differential Geometry and Differential Geometry and Differential Geometry</td>
</tr>
<tr>
<td>MATH 245A- 245C- 245C</td>
<td>Topics in Differential Geometry and Topics in Differential Geometry and Topics in Differential Geometry</td>
</tr>
<tr>
<td>MATH 250A- 250B- 250C</td>
<td>Algebraic Topology and Algebraic Topology and Algebraic Topology</td>
</tr>
<tr>
<td><strong>Logic</strong></td>
<td></td>
</tr>
<tr>
<td>MATH 280A- 280B- 280C</td>
<td>Mathematical Logic and Mathematical Logic and Mathematical Logic (core)</td>
</tr>
<tr>
<td>MATH 281A- 281B- 281C</td>
<td>Set Theory and Set Theory and Set Theory</td>
</tr>
<tr>
<td>MATH 282A- 282B- 282C</td>
<td>Model Theory and Model Theory and Model Theory</td>
</tr>
<tr>
<td>MATH 285A- 285B- 285C</td>
<td>Topics in Mathematical Logic and Topics in Mathematical Logic and Topics in Mathematical Logic</td>
</tr>
<tr>
<td><strong>Probability</strong></td>
<td></td>
</tr>
<tr>
<td>MATH 210A- 210B- 210C</td>
<td>Real Analysis and Real Analysis and Real Analysis</td>
</tr>
<tr>
<td>MATH 211A- 211B- 211C</td>
<td>Topics in Analysis and Topics in Analysis and Topics in Analysis</td>
</tr>
<tr>
<td>MATH 270A- 270B- 270C</td>
<td>Probability and Probability and Probability (core)</td>
</tr>
<tr>
<td>MATH 271A- 271B- 271C</td>
<td>Stochastic Processes and Stochastic Processes and Stochastic Processes (core)</td>
</tr>
</tbody>
</table>
Graduate Program in Mathematical, Computational, and Systems Biology

The graduate program in Mathematical, Computational, and Systems Biology (MCSB) is designed to meet the interdisciplinary training challenges of modern biology and function in concert with selected department programs, including the Ph.D. in Mathematics. Detailed information is available at the Mathematical, Computational, and Systems Biology website (http://mcsb.uci.edu) and in the Interdisciplinary Studies section of the Catalogue.

Faculty

Takeo Akasaki, Ph.D. University of California, Los Angeles, Professor Emeritus of Mathematics (ring theory)

Jun F. Allard, Ph.D. University of British Columbia, Assistant Professor of Mathematics; Physics and Astronomy (mathematical and computational biology)

Vladimir Baranovsky, Ph.D. University of Chicago, Associate Professor of Mathematics (algebra and number theory)

Frank B. Cannonito, Ph.D. Adelphi University, Professor Emeritus of Mathematics (group theory)

Long Chen, Ph.D. Pennsylvania State University, Professor of Mathematics (applied and computational mathematics)

Michael C. Cranston, Ph.D. University of Minnesota, Professor of Mathematics (probability)

Donald A. Darling, Ph.D. California Institute of Technology, Professor Emeritus of Mathematics

Christopher J. Davis, Ph.D. Massachusetts Institute of Technology, Lecturer with Potential Security of Employment of Mathematics (algebra and number theory)

Paul C. Eklof, Ph.D. Cornell University, Professor Emeritus of Mathematics (logic and algebra)

German A. Enciso Ruiz, Ph.D. Rutgers, the State University of New Jersey, Associate Professor of Mathematics; Developmental and Cell Biology (applied and computational mathematics, mathematical and computational biology)

Aleksandr Figotin, Ph.D. Tashkent University of Information Technologies, Professor of Mathematics (applied and computational mathematics, mathematical physics)

Mark Finkelstein, Ph.D. Stanford University, Professor Emeritus of Mathematics; Center for Educational Partnerships (analysis)

Matthew Foreman, Ph.D. University of California, Berkeley, Professor of Mathematics; Logic and Philosophy of Science (ergodic theory and dynamical systems, logic and foundations)

Michael D. Fried, Ph.D. University of Michigan, Professor Emeritus of Mathematics (arithmetic geometry and complex variables)

Isaac Goldbring, Ph.D. University of Illinois at Urbana-Champaign, Assistant Professor of Mathematics (logic and foundations)

Anton Gorodetski, Ph.D. Moscow State University, Professor of Mathematics (ergodic theory and dynamical systems)

Patrick Q. Guidotti, Ph.D. University of Zurich, Professor of Mathematics (analysis and partial differential equations, applied and computational mathematics)

Hamid Hezari, Ph.D. Johns Hopkins University, Assistant Professor of Mathematics (analysis and partial differential equations, applied and computational mathematics)

Svetlana Jitomirskaya, Ph.D. Moscow State University, Professor of Mathematics (mathematical physics)

Nathan Kaplan, Ph.D. Harvard University, Assistant Professor of Mathematics (algebra and number theory)

Abel Klein, Ph.D. Massachusetts Institute of Technology, Professor of Mathematics (mathematical physics)

Natalia Komarova, Ph.D. University of Arizona, Professor of Mathematics; Ecology and Evolutionary Biology (applied and computational mathematics, mathematical and computational biology, mathematics of complex and social phenomena)

Katsiaryna Krupchyk, Ph.D. Belarusian State University, Associate Professor of Mathematics (analysis and partial differential equations, inverse problems)

Rachel Lehman, Ph.D. University of California, Irvine, Lecturer of Mathematics (mathematics education and probability)
Peter Li, Ph.D. University of California, Berkeley, Professor Emeritus of Mathematics (geometry and topology)

Song-Ying Li, Ph.D. University of Pittsburgh, Professor of Mathematics (analysis and partial differential equations)

John S. Lowengrub, Ph.D. Courant Institute of Mathematical Sciences, UCI Chancellor's Professor of Mathematics; Biomedical Engineering; Chemical Engineering and Materials Science (applied and computational mathematics, mathematical and computational biology)

Zhiqin Lu, Ph.D. Courant Institute of Mathematical Sciences, Professor of Mathematics (geometry and topology)

Penelope J. Maddy, Ph.D. Princeton University, UCI Distinguished Professor of Logic and Philosophy of Science; Mathematics; Philosophy (philosophy of mathematics and logic, meta-philosophy)

Eric D. Mjolsness, Ph.D. California Institute of Technology, Professor of Computer Science; Mathematics (applied mathematics, mathematical biology, modeling languages)

Qing Nie, Ph.D. Ohio State University, Director of Center for Complex Biological Systems and Professor of Mathematics; Biomedical Engineering (computational mathematics, systems biology, cell signaling, stem cell)

Alessandra Pantano, Ph.D. Princeton University, Lecturer with Security of Employment of Mathematics (algebra and number theory)

David L. Rector, Ph.D. Massachusetts Institute of Technology, Professor Emeritus of Mathematics (algebraic topology and computer algebra)

Robert C. Reilly, Ph.D. University of California, Berkeley, Professor Emeritus of Mathematics (geometry and topology)

Karl Rubin, Ph.D. Harvard University, Edward and Vivian Thorp Chair in Mathematics and Professor of Mathematics (algebra and number theory)

Bernard Russo, Ph.D. University of California, Los Angeles, Professor Emeritus of Mathematics (functional analysis)

Donald G. Saari, Ph.D. Purdue University, UCI Distinguished Professor of Economics; Logic and Philosophy of Science; Mathematics

Martin Schechter, Ph.D. New York University, Professor of Mathematics (analysis and partial differential equations, mathematical physics)

Stephen Scheinberg, Ph.D. Princeton University, Professor Emeritus of Mathematics

Richard M. Schoen, Ph.D. Stanford University, UCI Excellence in Teaching Chair in Mathematics and Professor of Mathematics (differential geometry, partial differential equations, general relativity)

Alice Silverberg, Ph.D. Princeton University, Professor of Mathematics; Computer Science (algebra and number theory)

William H. Smoke, Ph.D. University of California, Berkeley, Professor Emeritus of Mathematics (homological algebra)

Knut Solna, Ph.D. Stanford University, Professor of Mathematics (applied and computational mathematics, inverse problems and imaging, probability)

Ronald J. Stern, Ph.D. University of California, Los Angeles, Professor Emeritus of Mathematics (geometry and topology)

Jeffrey D. Streets, Ph.D. Duke University, Associate Professor of Mathematics (geometry and topology)

Chuu-Lian Terng, Ph.D. Brandeis University, Professor Emerita of Mathematics (differential geometry and integrable systems)

Edriss S. Titi, Ph.D. Indiana University, Professor Emeritus of Mathematics (analysis and partial differential equations, applied and computational mathematics)

Thomas Trogdon, Ph.D. University of Washington, Assistant Professor of Mathematics (applied and computational mathematics, probability)

Li Sheng Tseng, Ph.D. University of Chicago, Associate Professor of Mathematics (geometry and topology, mathematical physics)

Howard G. Tucker, Ph.D. University of California, Berkeley, Professor Emeritus of Mathematics (probability and statistics)

Sean P. Walsh, Ph.D. University of Notre Dame, Associate Professor of Logic and Philosophy of Science; Linguistics; Mathematics (philosophy of mathematics, philosophy of logic and mathematical logic)

Daqing Wan, Ph.D. University of Washington, Professor of Mathematics (algebra and number theory)

Frederic Yui-Ming Wan, Ph.D. Massachusetts Institute of Technology, Professor of Mathematics; Mechanical and Aerospace Engineering (applied and computational mathematics, mathematical and computational biology)

Robert W. West, Ph.D. University of Michigan, Professor Emeritus of Mathematics (algebraic topology)

Joel J. Westman, Ph.D. University of California, Los Angeles, Professor Emeritus of Mathematics (analysis)
Robert J. Whitley, Ph.D. New Mexico State University, *Professor Emeritus of Mathematics* (analysis)

Janet L. Williams, Ph.D. Brandeis University, *Professor Emerita of Mathematics* (probability and statistics)

Dominik Franz X. Wodarz, Ph.D. Oxford University, *Professor of Ecology and Evolutionary Biology; Mathematics*

Jack Xin, Ph.D. New York University, *Professor of Mathematics* (applied and computational mathematics, mathematical and computational biology, probability)

James J. Yeh, Ph.D. University of Minnesota, *Professor Emeritus of Mathematics* (analysis and partial differential equations, probability)

Yifeng Yu, Ph.D. University of California, Berkeley, *Professor of Mathematics* (analysis and partial differential equations)

Martin Zeman, Ph.D. Humboldt University of Berlin, *Professor of Mathematics; Logic and Philosophy of Science* (logic and foundations)

Xiangwen Zhang, Ph.D. McGill University, *Assistant Professor of Mathematics* (geometry and topology)

Hong-Kai Zhao, Ph.D. University of California, Los Angeles, *Department Chair and Chancellor's Professor of Mathematics; Computer Science* (applied and computational mathematics, inverse problems and imaging)

Weian Zheng, Ph.D. University of Strasbourg, *Professor Emeritus of Mathematics* (probability theory and financial engineering)