

# MATHEMATICS AND STATISTICS

LUC.EDU/CAS

Loyola University Chicago's College of Arts and Sciences (CAS) offers undergraduates a comprehensive liberal arts education that introduces them to various disciplines and viewpoints in the natural sciences, social sciences, and humanities. CAS students develop valuable career and life skills, including critical thinking, strong verbal and writing abilities, comprehensive general knowledge, social awareness, and research competencies. As the largest of Loyola's 10 schools, CAS has extensive resources, providing students with modern labs and electronic classrooms, opportunities to participate actively in research, and a distinguished faculty of teacher-scholars.

Recent growth and renovation at both Loyola's Lake Shore and Water Tower Campuses have enhanced living and learning for students. Recent additions to the Lake Shore Campus include the Norville Center for Intercollegiate Athletics, a state-of-the-art facility that includes a new strength and conditioning center, a sports medicine facility, student athlete activity spaces, and offices for athletics administrators. Future enhancements include a new student union and academic building, among others.

For more information about what's new at Loyola, visit [LUC.edu/undergrad/whatsnew](http://LUC.edu/undergrad/whatsnew).



*Information Commons, a new four-story lakeside research facility at the Lake Shore Campus, opened in early 2008 and provides individual study space for students, state-of-the-art technology with more than 250 computers, wireless Internet connections, and a lakefront café.*

## THE MAJORS

The major in mathematics offers students a solid background in the classical areas of real and complex analysis, modern algebra, and topology. Students are encouraged to develop interests in applied areas such as operations research, probability, computer science, numerical analysis, financial mathematics, and mathematical economics. Advanced students have ample opportunity to pursue independent study under the guidance of faculty members. The major in mathematics prepares talented students to enter MS or PhD degree programs at prestigious universities throughout the nation.

A mathematics education track prepares students to teach mathematics at the secondary level. There is a great demand nationally for secondary mathematics teachers. Students who complete the requirements for this degree will meet the certification requirements for the State of Illinois and all other states that use the National Council for Accreditation of Teacher Education (NCATE) standards for mathematics.

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# MATHEMATICS AND STATISTICS

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## THE MAJORS [CONTINUED]

The major in statistics offers a strong background in applied probability theory, regression, design of experiments, stochastic processes, and simulation and modeling techniques. Students are prepared and encouraged to pass the first actuarial examination. Graduates of the program are well-equipped to obtain entry-level positions as actuaries or statisticians; some prefer to seek an advanced degree in statistics or operations research.

A combined mathematics and computer science major is offered to students who wish to understand the rich interplay between the two disciplines. A combined degree in theoretical physics and applied mathematics is also available.

Students may also minor in biostatistics, actuarial science, mathematics, statistics, or operations research.

### Five-Year BS/MS Degree

This BS/MS degree program enables a student to begin graduate studies in mathematics or applied statistics during the junior or senior year and to complete both the BS and MS degree requirements in five years. Advanced students may also be eligible for teaching or research assistantships. Offered by the Graduate School, such awards are based entirely on merit.

### Career Opportunities

A recent edition of *Jobs Almanac* placed mathematician and actuary among the top five most desirable careers out of the 250 careers ranked according to income, outlook, physical demands, security, stress, and work environment. According to the U.S. Bureau of Labor Statistics, the increase in demand for mathematicians and statisticians over the next 10 years will outpace that of most other professions.

The job opportunities in the Chicago area for statistics and mathematics graduates have generally been well above the national norm. Chicago's financial markets offer even more unique and exciting opportunities.

Loyola's graduates have found careers in the actuarial sciences, teaching at the high school and elementary school levels, business management, financial and research analysis, operations research,

technical writing, accounting, engineering, statistics, and consulting, among others. Starting salaries are normally in the \$35,000 to \$60,000 range. BS/MS dual-degree graduates earn significantly more.

Many graduates have continued their education in medical, veterinary, and dental schools, as well as in MBA programs and law schools. Others have chosen to earn advanced degrees in engineering.

### Individual Attention

Class size in upper-division classes is kept low (normally 10 to 20 students) to create ample opportunity for class discussion and interaction. Professors are readily available to provide assistance to students outside class. All major courses at Loyola are taught by full-time faculty members.

Each student majoring in mathematics or statistics is assigned a faculty advisor in the department. Such faculty advisors can also offer valuable assistance to students in finding a job or gaining admission to a graduate or professional school.

Tutoring in mathematics and statistics is available year-round at the Tutoring Center, located in Loyola's Sullivan Center for Student Services. Tutors are selected from graduate and advanced undergraduate students in mathematics.

### Student Activities

Many Loyola math majors are actively involved in the Math Club. Activities have included a lecture series in mathematics and statistics presented by speakers from other universities and industry; field trips to Argonne National Laboratory and Fermi Lab; and tutoring programs, social events, and fundraising activities. Every spring, members of the Math Club assist in the Chicagowide high school math contest hosted by Loyola. Loyola mathematics students also compete in the William Lowell Putnam national mathematics competition.

### Departmental Honors

A student whose GPA in all major courses is at least 3.7 qualifies for departmental honors. Students who have achieved at least a "B+" average in their major courses are eligible for nomination to the Mathematics Honorary Society, Pi Mu Epsilon.

### The Faculty

Loyola's faculty members in mathematics and statistics are very active in research, and many have international reputations in their fields. Faculty members have been supported by research grants from the National Science Foundation, the National Security Agency, the United States Department of Education, the United States Air Force, the Office of Naval Research, and the Humboldt Foundation. Excellence in teaching is considered to be a primary goal of each faculty member.

# MATHEMATICS AND STATISTICS

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**Chairperson: Robert Jensen, PhD**, Northwestern University  
**Danut Arama, PhD**, Carnegie Mellon University  
**E.N. Barron, PhD**, Northwestern University  
**Martin Buntinas, PhD**, Illinois Institute of Technology  
**John Del Greco, PhD**, Purdue University  
**Stephen Doty, PhD**, University of Notre Dame  
**Anthony Giaquinto, PhD**, University of Pennsylvania  
**Rafal Goebel, PhD**, University of Washington  
**Christine Haught, PhD**, Cornell University  
**William C. Huffman, PhD**, California Institute of Technology  
**Anne P. Hupert, PhD**, University of Chicago  
**Laurie Braga Jordan, MS**, University of Illinois, Chicago  
**Aaron Lauve, PhD**, Rutgers, The State University of New Jersey  
**Richard Lucas, PhD**, University of Illinois, Chicago  
**Joseph Mayne, PhD**, Illinois Institute of Technology  
**Anne McDonald, PhD**, Yale University  
**Timothy O'Brien, PhD**, North Carolina State University  
**Alan Saleski, PhD**, University of California, Berkeley  
**Adam Spiegler, PhD**, University of Arizona  
**Liping Tong, PhD**, University of Chicago  
**Charles Widener, MS**, Syracuse University, and **MS**, Loyola University Chicago

**FTTT Assistant Professor:**  
**Marian Bocea, PhD**, Carnegie Mellon University

**FTNTT Instructors:**  
**Loretta Bartolini, PhD**, University of Melbourne  
**Mario Borha, MS**, Loyola University Chicago

## Course Offerings

### MATHEMATICS (MATH)

100	Intermediate Algebra
108	Quantitative Literacy
117	College Algebra
118	Pre-Calculus
123	Topics in Math
131–132	Applied Calculus
147–148	Mathematics for Teachers I, II
161–162	Calculus I, II
201	Theory of Numbers
212	Linear Algebra
215	Object-oriented Programming for Math
263	Multivariable Calculus
264	Ordinary Differential Equations

277	Problem-solving Seminar
298	Mathematics Seminar
301	History of Mathematics
304–305	Probability and Statistics I, II
306	Introduction to Stochastic Processes
309	Numerical Methods
313	Abstract Algebra
314	Advanced Topics in Abstract Algebra
315	Advanced Topics in Linear Algebra
318	Combinatorics
320	Mathematical Logic
344	Geometry
351–352	Real Analysis I, II
353	Introductory Complex Analysis
355	Methods of Applied Mathematics
358	Methods in Operations Research
386	Introduction to Topology
388	Special Topics in Mathematics
398	Independent Study

### STATISTICS (STAT)

103	Fundamentals of Statistics
203	Statistics
303	SAS Programming and Applied Statistics
304–305	Probability and Statistics I, II
306	Introduction to Stochastic Processes
307	Statistical Design and Analysis of Experiments
308	Applied Regression Analysis
335	Introduction to Biostatistics
336	Advanced Biostatistics
356	Computer Principles of Modeling and Simulation
358	Methods in Operations Research
388	Special Topics in Statistics
391	Internship in Actuarial Science
396–397	Actuarial Seminar I, II
398	Independent Study

## Requirements

### MATHEMATICS

Thirteen courses (42 credit hour minimum) are required: MATH 161, 162, 201, 212, 215, 263, 264, 313, 351; either 314 or 315; either 352 or 353; STAT 203 or 335; one additional (three-credit) 300-level math course.

### MATHEMATICS (EDUCATION TRACK)

Twelve courses are required (39 credit hour minimum) in the College of Arts and Sciences: MATH 161, 162, 201, 212, 215, 263, 301, 313, 318, 320, 344; STAT 203 or 335. In addition, students must complete all coursework in the School of Education required for Illinois State Secondary Education Certification (Type 09 in Mathematics).

For more information about this program, please visit [LUC.edu/education](http://LUC.edu/education).

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# MATHEMATICS AND STATISTICS

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## Requirements (continued)

### MATHEMATICS AND COMPUTER SCIENCE

Nineteen courses are required (60 credit hour minimum): MATH 161, 162, 201, 212, 263, 264, 313, 351; STAT 203 or 335; two of MATH 309, 314, 315, 352, 353; COMP 150, 264, 271; either MATH 215 or COMP 170; either COMP 363 or 376; one of COMP 336, 337, 338, 353, 373, 388; any two 300-level three-credit CS courses. For computer science course listings, please see the computer science brochure, available at [LUC.edu/undergrad/academics](http://LUC.edu/undergrad/academics).

### STATISTICS

Twelve courses are required (39 credit hour minimum): MATH 161, 162, 212, 263; STAT 203 or 335, 303, 304, 305; four of STAT 306, 307, 308, 356, 358, and 388.

### THEORETICAL PHYSICS AND APPLIED MATHEMATICS

Twenty-one courses are required (63 credit hours): MATH 161, 162, 201, 212, 263, 264, 313, 351, 353; Physics (PHYS) 125, 126, 126F, 135, 136; PHYS 238, 301, 314, 328, 351, 361; PHYS 315 or 352; MATH 215 or COMP 170. For physics course listings, please see the physics and engineering brochure, available at [LUC.edu/undergrad/academics](http://LUC.edu/undergrad/academics).

In addition to fulfilling major requirements to earn an undergraduate degree, students complete Loyola's Core Curriculum, which teaches them important skills and values. Students also develop additional interests by taking general electives.

## Core Curriculum

- Focuses on desired knowledge, skills, and values in addition to academic disciplines.
- Includes 45 credit hours of coursework, developing important skills through 10 required areas of knowledge:
  - Important skills include communication, critical thinking, ethical awareness, information literacy, quantitative and qualitative analysis, research methods, and technological literacy.
  - Required areas include college writing seminar(s), artistic knowledge and experience, historical knowledge, literary knowledge, scientific literacy, societal and cultural knowledge, philosophical knowledge, theological and religious studies, and ethics.

Information in this brochure is correct as of July 2011.

For the most up-to-date information, visit [LUC.edu/undergrad/academics](http://LUC.edu/undergrad/academics)

Loyola is an equal opportunity educator/employer.

- "Values Across the Curriculum" requirements:
  - 12 credit hours completed through the Core, major, or electives, focusing on:
    - Understanding and promoting justice
    - Understanding diversity in the United States and the world
    - Understanding spirituality or faith in action in the world
    - Promoting civic engagement or leadership
- Makes up about one-third of a student's Loyola academic experience, complemented by the major and electives.
- Incorporates great flexibility with myriad courses from which to choose for each required area. Courses may be completed at any time during a student's Loyola education.

For more information, please visit

» [LUC.edu/core](http://LUC.edu/core)

## CONTACT US

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