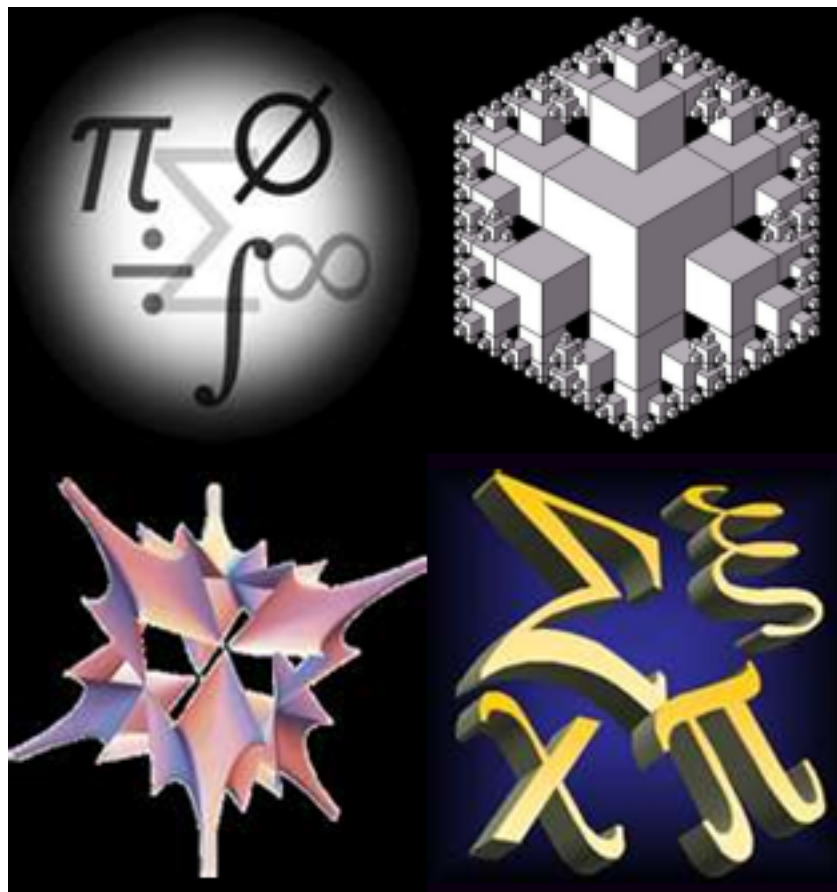


Undergraduate Programs
in
Mathematics
at
The University of Arizona



2009–2010

This booklet describes the undergraduate degree programs in Mathematics available for a student at The University of Arizona. It also contains information about facilities, activities, jobs, advisors, and other services and activities supportive of the undergraduate math programs, e.g., what they are, where to find them, whom to contact, and so on.

The contents of this booklet are a subset of the information available at the website <http://math.arizona.edu/ugprogram/> and the latest version of this booklet, in PDF form, may be downloaded from that web address. You are presently looking at the booklet created on: October 14, 2009

To request an appointment with an Advisor or ask a question, please use the form at <http://math.arizona.edu/ugprogram/mcenter/contactus.html>.

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Why study mathematics?



In many disciplines, the history of the twentieth century tells of the introduction of more and more mathematical techniques. Mathematics has been established as a universal ingredient in the understanding of the world, and is the language used in conveying this understanding. As we enter the twenty-first century, higher mathematics is not just a tool for physical scientists and engineers, but it is also of crucial importance in business, economics, and even the social sciences. Many mathematicians still delight in the aesthetic appeal of their subject; however, it is ultimately the application of mathematics that makes it a critical element in modern civilization.

Why declare a math major?

Undergraduate training in mathematics is an important step along many career paths. It is essential for those who intend to continue toward a graduate degree in

Mathematics, Applied Mathematics, Statistics, or Computer Science. Admissions committees for graduate studies in Astronomy, Physics, Engineering, Economics, or Finance often prefer students with undergraduate mathematics majors (together with the proper minor) over students who have majored in their own subject. Some University of Arizona mathematics graduates have also used their degree as the first step toward professional degrees in law, medicine, and even divinity.

The mathematics major is not just a path toward graduate education. Mathematics training is training in general problem solving. Many employers recognize this fact; they also recognize that a Bachelors degree in mathematics is proof of an ability and willingness to work hard. Many Mathematics majors have found success by completing more than one major. Double majors in Mathematics and Science, Mathematics and Business, or even Mathematics and a Social Science, prepare graduates with enhanced ability to compete well in the job market.

Mathematics majors are advised to develop both computing skills and communication skills during their time as a student. Computing skills are increasingly important in today's society. Experience using graphing calculators and standard mathematical software packages, programming experience, and experience using the Internet are extremely useful. And in virtually any type of position, the need for good communication skills is paramount.

More reasons to become a math major

Let us not forget one of the main reasons for becoming a mathematics major. It is fun! The mathematics program affords students plenty of time to link their mathematical interests to other intellectual endeavors. Students who combine mathematics, computer science, and another area will find themselves with many options when they graduate with an undergraduate degree.

The Department of Mathematics created the Math Center to ensure that our mathematics majors have a home base to turn to during their undergraduate studies. One of our goals is to integrate the undergraduate mathematics major into the intellectual life of this university and this nation. The working mathematician is involved in three areas: the creation of new mathematics, the application of mathematics to solve real-world problems, and the teaching of mathematics. Many of our undergraduate mathematics majors are able to perform these same activities during their undergraduate years through various research and teaching/tutoring opportunities and summer internship opportunities.

Careers in Mathematics

There are few jobs with the title *Mathematician*. Mathematics majors may end up in a job with a title such as *Engineer* or *Analyst*. Career opportunities in the mathematical sciences fall into two broad categories, Educators and Practitioners:

Educators

University Professor

A Ph.D. degree in mathematics is required for this position. A university professor of mathematics teaches courses, mentors students, and provides service to the institution and the community. A university professor can also be considered a practitioner to the extent that he/she conducts research and develops new mathematical knowledge. A university professor may also engage in consulting activities.

College Teacher

College mathematics teachers may have a Master's degree or a Ph.D., depending on the level and nature of the institution. Responsibilities may be exclusively instruction-related, as in the case of a community college, or may include some research.

High School Teacher

Well-qualified mathematics teachers are in high demand. A Bachelor's degree is the minimum requirement for teaching in secondary schools. State requirements for certification, which usually include courses in education, must also be met. The traditional areas of secondary school mathematics—algebra, geometry, and trigonometry—have been augmented in many schools by analytic geometry and calculus and other courses that are intended to meet diverse student needs. Newer curricula include computer programming, probability and statistics, linear algebra, and applications. The prospective teacher who is familiar with these latter areas will have a competitive advantage.

Practitioners

Actuary

Actuaries are hired by insurance companies (life, health, casualty, etc.), pension plans, businesses, consulting firms (business and actuarial), and government agencies. To become an actuary (Associate or Fellow), one must pass a series of examinations administered by the Society of Actuaries. The initial exams are primarily mathematics, including probability and statistics, and can be taken while still an undergraduate student. Because actuarial science is a mixture of mathematics and business, the student should speak with an advisor about other course work needed to prepare for this career.

Computational Scientist

A computational scientist is an applied mathematician who interprets problems arising from the physical sciences and engineering in mathematical form and develops mathematical solutions to these problems. Very large and sophisticated computers are used intensively. Potential employers include government laboratories, the chemical industry, and the biotech industry.

Operations Research Analyst

Also called management science analysts, operations research analysts help organizations coordinate activities and operate in the most efficient manner, by applying scientific methods and mathematical principles to organizational problems. Computers are used extensively in their work. Students interested in this career path should minor in Computer Engineering (COE) or Systems and Industrial Engineering (SIE).

Systems Engineer or Systems Analyst

A systems engineer or analyst usually has substantial course work in engineering or another technical field. This enables him/her to apply mathematical techniques to solve the problems unique to the industry of their employer. Students interested in this career path should consider minoring in Systems and Industrial Engineering (SIE).

Scientific Communication

The scientific publishing industry has a need for scientifically trained individuals for sales and editing. Excellent writing and oral communication skills are essential in this career field. Accurate and understandable technical writing is widely needed.

Software Engineer or Software Consultant

A software engineer generally designs and writes software that performs nonnumerical functions, such as graphics. A background in math and computer science is needed. Employers include consulting firms and large corporations which do their own software development. There is also room in this field for the entrepreneur or consultant.

Statistician

Statistics is both a very applied field and also a theoretical one. Many, but not all, statisticians are active in both applications and the development of new theory, but the greatest potential in terms of jobs is in applied statistics. Statisticians generally work with people in other fields, therefore communication skills are very important. Statistical applications nearly always include the analysis of data and hence some knowledge and experience in computing is very important. There are opportunities for statisticians in the government, in industry, business, medicine, and in academia.

Research Mathematician

In non-academic positions, research mathematicians conduct mathematical research in areas of interest to large corporations and various departments of government. These include the Department of Energy, various branches of the military, and security agencies. While the demand for non-academic research mathematicians has been shrinking in recent years, there still are positions available at national laboratories, the National Security Agency (NSA), and other government entities, as well as some large corporations. An advanced degree is usually required for these positions.

Undergraduate Mathematics Degrees and Requirements

The mathematics major is designed to meet many different needs. Our programs allow the student to choose from several options that are each tailored to the individual's talents, interests, and career goals. A student may prepare for a variety of careers (see p. 7) by selecting the appropriate option and minor. Students choosing a mathematics major can take advantage of the full range of mathematical resources available on campus.

The University offers two different major degrees in mathematics:

- Bachelor of Arts (B.A.) in Mathematics
- Bachelor of Science (B.S.) in Mathematics

B.A./B.S. in Mathematics

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

Both the Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) in Mathematics require a core of basic courses (listed on p. 14) followed by additional courses specific to one of seven possible options:

- **Comprehensive Option:** This option prepares students for graduate study in mathematics or applied mathematics. (see p. 15)
- **Computer Science Option:** This option is for students interested in applications of computers to mathematical problems, including math majors who plan to attend graduate school in computer science. (see p. 16)
- **Economics or Business Option:** This option is for students with a particular interest in business applications of mathematics, especially those preparing for graduate school in economics or finance. (see p. 17)
- **General/Applied Mathematics Option:** This option is for students who intend to enter the job market upon graduation, but may also be appropriate for students who plan to go on to graduate school in a field of science or engineering. (see p. 18)
- **Probability and Statistics Option:** This option is for students considering a career as an actuary or statistician, as well as for students wanting to attend graduate school in statistics. (see p. 19)
- **Life Sciences Option:** This option is for students considering a career in medicine, as well as for students wanting to attend graduate school in the biological sciences. (see p. 20)
- **Mathematics Education Option:** This option prepares students for teaching mathematics at the secondary school level. The option has two main components: a set of courses in mathematics, and a set of courses in teaching and learning mathematics in secondary schools. (see p. 21)

Each option requires at least 15 units of 400-level mathematics courses, and each option, except Mathematics Education, requires the student to complete a minor. Courses in minors must be distinct from those in the major.

The complete official requirements for each option are given in the *University Catalog* in the form of an *Academic Program Requirements Report (APRR)*. Below we cover the portion of the requirements specific to the mathematics major. It is important for students to consult with their academic advisor about their choice and order of courses, as well as which optional courses would strengthen their degree program.

Comparing the B.A. and the B.S.

As far as the mathematics coursework is concerned, the B.A. and B.S. are identical: they each require the core courses (listed on p. 14) and one of the seven options. The two degrees differ only in the following ways:

- Foreign language requirement (details below).
- Science/application course requirements (details below).

The B.A. in Mathematics

- **Language Requirement:** Students must have *fourth semester proficiency* in a foreign language.
- The degree is not science-intensive. Students need to complete only the two Tier One (NATS) and one Tier Two Natural Science courses, as specified in the University General Education requirements (<http://gened.arizona.edu/gened/general/nutshell.htm>).

The B.S. in Mathematics

- **Language Requirement:** Students must have *second semester proficiency* in a foreign language.
- **Laboratory Science Courses Requirement:** The degree is science-intensive and requires one of the following sequences of laboratory science courses:
 - PHYS 131 & 181 & 132 & 182
 - PHYS 141 & 142
 - PHYS 141 & 241
 - PHYS 161H & 162H
 - CHEM 151 & 152
 - CHEM 105A & 106A & 105B & 106B
 - MCB 181R & 181L & ECOL 182R & 182L
 - GEOS 251 & 302
 - GEOS 251 & 304

- **Application Courses Requirement:** (This requirement does not apply to the Mathematics Education Option.) Students must complete at least six units of non-math coursework with a prerequisite or corequisite of at least Calculus I (MATH 124 or higher). Choose from the following: CHEM 105A, 105B, 407, 480A; C SC 345, 422, 433, 436, 437, 445, 453, 460, 473; ECON 332, 361; GEOS 322, 356, 411, 419, 431, 432, 434A, 448; PHYS 131, 132, 141, 142, 161H, 162H, 204, 241, 242, 251; or courses approved by your academic advisor.

Note: B.S. students may satisfy both the Laboratory Science Courses Requirement and the Application Courses Requirement by completing one of the Physics sequences. The University's Tier Two General Education Requirement for Natural Science is satisfied for B.S. students by MATH 215, which is one of the Core Courses.

Core Courses

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

All seven options for the B.A./B.S. require the following core courses, which should be completed by the end of the sophomore year.

- C SC 127A — Introduction to Computer Science
- MATH 124 or MATH 125 — Calculus I
- MATH 129 — Calculus II (*)
- MATH 215 — Introduction to Linear Algebra
- MATH 223 — Vector Calculus
- MATH 323 — Formal Mathematical Reasoning and Writing (†)
- MATH 355 — Analysis of Ordinary Differential Equations (*)

(*) The pair MATH 129 and MATH 355 may be replaced with MATH 250A and MATH 250B (Calculus and Differential Equations I and II).

(†) MATH 323 is a writing-emphasis course that is the foundation for the advanced courses taken by any math major. It should be taken as soon as possible and before most of the 400-level courses in the major. Students who do not earn at least a C in MATH 323 should reconsider their choice of major.

Comprehensive Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

This option covers the minimum requirements for admission to most graduate programs in mathematics and applied mathematics. We have separate information on selecting the appropriate option and courses to prepare for various types of graduate programs (see (<http://math.arizona.edu/ugprogram/mcenter/gradprep.html>)).

Students selecting the comprehensive option should consult with a Mathematics Department faculty advisor in choosing additional course work to ensure that they are prepared for the graduate school of their choice. A minor in any subject is required with this option.

- Core Courses (listed on p. 14)
- MATH 413 — Linear Algebra
- MATH 424 — Elements of Complex Variables
- MATH 425A — Real Analysis of One Variable
- MATH 425B — Real Analysis of Several Variables
- One of the following two pairs:
 1. MATH 415A — Introduction to Abstract Algebra
 2. MATH 415B — Second Course in Abstract Algebra

or

1. MATH 454 — Ordinary Differential Equations and Stability Theory
2. MATH 456 — Applied Partial Differential Equations

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Computer Science Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

A minor in computer science (<http://www.cs.arizona.edu/undergrad/minors.html>) is required with this option.

- Core Courses (listed on p. 14)
- One of the following three sequences:
 1. MATH 415A — Introduction to Abstract Algebra
 2. MATH 415B — Second Course in Abstract Algebra
- or
 1. MATH 464 — Theory of Probability
 2. MATH 466 — Theory of Statistics
- or
 1. MATH 475A — Mathematical Principles of Numerical Analysis
 2. MATH 475B — Mathematical Principles of Numerical Analysis
- Two of the following six courses:
 - MATH 413 — Linear Algebra
 - MATH 443 — Theory of Graphs and Networks
 - MATH 445 — Introduction to Cryptography
 - MATH 446 — Theory of Numbers
 - MATH 447 — Combinatorial Mathematics
 - MATH 479 — Game Theory and Mathematical Programming
- A fifth 400-level course, chosen in consultation with your faculty advisor.

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Economics or Business Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

This option requires either

- an Economics Minor (<http://econ.arizona.edu/undergraduate/minors.asp>), or
- a General Business Minor (<http://ugrad.eller.arizona.edu/academics/minors/business.asp>), or
- a Thematic Minor (<http://www.registrar.arizona.edu/thematicminor.htm>) emphasizing courses from two or more disciplines/subject areas such as Economics, General Business, and Finance.

The minor should be chosen in consultation with an advisor.

- Core Courses (listed on p. 14)
- MATH 425A — Real Analysis of One Variable
- MATH 464 — Theory of Probability
- One of the following two courses:
 - MATH 410 — Matrix Analysis
 - MATH 413 — Linear Algebra
- One of the following three courses:
 - MATH 425B — Real Analysis of Several Variables
 - MATH 466 — Theory of Statistics
 - MATH 468 — Applied Stochastic Processes
- A fifth 400-level course, chosen in consultation with your faculty advisor.

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

General/Applied Mathematics Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

A minor in any subject is required with this option.

- Core Courses (listed on p. 14)
 - MATH 422 — Advanced Applied Analysis
 - MATH 485 — Mathematical Modeling
 - One of the following three sequences:
 1. MATH 454 — Intermediate Ordinary Differential Equations
 2. MATH 456 — Applied Partial Differential Equations
- or
1. MATH 464 — Theory of Probability
 2. MATH 466 — Theory of Statistics
- or
1. MATH 475A — Mathematical Principles of Numerical Analysis
 2. MATH 475B — Mathematical Principles of Numerical Analysis
- A fifth 400-level course, chosen in consultation with your faculty advisor.

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Probability and Statistics Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

A minor is required with this option. By discussing with an advisor the choice of the minor, the student can greatly enhance his/her career opportunities. For additional information and suggestions, see the Probability and Statistics Webpage maintained by Professor Donald Myers (http://www.u.arizona.edu/~donaldm/homepage/prob_st.html).

- Core Courses (listed on p. 14)
- MATH 425A — Real Analysis of One Variable
- MATH 464 — Theory of Probability
- MATH 466 — Theory of Statistics
- One of the following two courses:
 - MATH 468 — Applied Stochastic Processes
 - MATH 413 — Linear Algebra
- A fifth 400-level course, chosen in consultation with your faculty advisor.

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Life Sciences Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

A minor in the biological sciences is required for this option. Possibilities include BIOC, GBIO, ECOL, MCB, MICR, PS, PSIO, V SC, and PL S, PRHP, or a thematic minor (<http://www.registrar.arizona.edu/thematicminor.htm>) with a life sciences emphasis. Courses which may be of interest for your minor include: ECOL 320, 340, 380, 416, 426, 453, 496J; MCB 410, 411, 422.

- Core Courses (listed on p. 14)
- MATH 422 — Advanced Applied Analysis
- MATH 464 — Theory of Probability
- One of the following three courses:
 - MATH 380 — Math Models in Biology
 - MATH 485 — Mathematical Modeling
 - MATH 496N — Non-Linear Dynamics of Biological Systems
- One of the following two courses:
 - MATH 410 — Matrix Analysis
 - MATH 413 — Linear Algebra
- One of the following two courses:
 - MATH 454 — Ordinary Differential Equations and Stability Theory
 - MATH 456 — Applied Partial Differential Equations
- One of the following two courses:
 - MATH 466 — Theory of Statistics
 - MATH 468 — Applied Stochastic Processes

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Mathematics Education Option

The information and requirements given here apply to the 2009–2010 catalog. For other catalog years, please consult the archive (<http://math.arizona.edu/ugprogram/degrees/archive/>).

This option is for students preparing to teach mathematics at the secondary school level. The Education Option has two main components, a set of courses in mathematics, and a set of courses in teaching and learning mathematics in secondary schools. This option does not require a minor. The Math Education Program website (<http://math.arizona.edu/~merp/teachprep.html>) contains additional information about admission and requirements.

- Core Courses (listed on p. 14)
- Courses in Mathematics:
 - MATH 315 — Introduction to Number Theory and Modern Algebra
 - MATH 330 — Topics in Geometry
 - MATH 362 — Introduction to Probability Theory
 - MATH 404 — History of Mathematics
 - MATH 407 — Synthesis of Mathematical Concepts
- Courses in Teaching and Learning Mathematics:
 - STCH 250 — Teaching Mathematics
 - STCH 310 — Adolescent Development and Learning
 - LRC 435 — Literacy/Diversity
 - SERP 301B — Mainstreaming
 - One of the following two sequences (Structured English Immersion course work required for AZ certification beginning May 2011):
 1. LCEV 408 — Foundations (UA South; online course)
 2. LCEV 416 — Methods (UA South; online course)

or

 - 1. EDU 286 — Foundations (Pima Community College)
 - 2. EDU 287 — Methods (Pima Community College)
 - MATH 406A — Curriculum and Assessment in Mathematics
 - MATH 406B — Methods of Teaching Mathematics in Secondary School
 - STCH 494C — Student Teaching
- Constitution Requirement for Arizona State certification.
 - This requirement is fulfilled by completing one of the following: POL 210; POL 201 and (POL 214 or POL 230); a passing score on the Arizona and US Constitution exams. POL 201 will also fulfill the Tier II INDV requirement.

For an example of how to order your coursework to heed prerequisites and meet all degree requirements, please consult the sample 4-year plans (<http://math.arizona.edu/ugprogram/mcenter/resources.html>). You will develop an individualized plan in consultation with your faculty advisor.

Activities and Events

The Undergraduate Math Majors Advising Center

The *Undergraduate Math Majors Advising Center*, known simply as *The Math Center*, supports our undergraduate mathematics degree programs. The Math Center provides advising to math majors and minors on course selection and program requirements. Additionally, we organize events for undergraduates and provide facilities for undergraduate activities including the MathCats student club.

Math Majors Events Calendar

The Math Center maintains a calendar of events of interest to undergraduate math majors. Some of these events are put on *specifically for math majors*—some of them are even organized or sponsored by the Math Center itself. But we also list other events that we believe to be of special interest to math majors. The current listing is on the Math Center Events webpage (<http://math.arizona.edu/ugprogram/activities/events.html>).

The MathCats Club

MathCats is the undergraduate club for students of all majors who are interested in mathematics. It provides opportunities for students to get to know each other, share experiences, have fun, and help each other succeed.

William Lowell Putnam Mathematical Competition

The first Saturday in December, some UA undergraduate students participate in the William Lowell Putnam Mathematical Competition (<http://math.scu.edu/putnam/>), a national contest sponsored by the Mathematical Association of America (MAA). The competition consists of two 3-hour sessions, during each of which each student individually attempts to solve six problems. The exam is designed to test

originality and creativity in mathematical thinking. The MAA maintains a list of top participants (<http://maa.org/awards/putnam.html>) from past competitions.

UA Mathematics Problem Solving Group Seminar

The *UA Mathematics Problem Solving Group Seminar* meets informally once a week to ponder challenging mathematical problems and learn important techniques for solving them. A knowledge of calculus is necessary for some problems, but many problems require only insight and ingenuity.

All UA undergraduate students are welcome to participate. It is also possible to register for the seminar as a one-credit pass-fail course, MATH 294A. For more information, including the meeting place and time for the current semester, see the MATH 294 website (<http://math.arizona.edu/~savitt/teaching/math294/>).

Department Math Colloquia

The Department of Mathematics and the Graduate Interdisciplinary Program in Applied Mathematics organize various colloquia, seminars, and other talks throughout each semester. Whenever such an event is specifically aimed at undergraduate math majors, it is well-publicized and listed on our calendar. However, in general, the colloquia series are always aimed at a wide audience, and undergraduates should consider attending these talks.

Undergraduate Colloquium

On selected afternoons during each semester, the math department organizes hour-long programs designed especially for undergraduate students. Sometimes it is a talk on a mathematical topic by a faculty member or visitor. Sometimes the speaker is a math undergraduate student. Some talks concern an area of mathematics, while other talks are on practical matters such as careers, graduate school, and selecting upper-division math courses.

Mathematics / Applied Mathematics Colloquium

At least twice a week, talks are presented by distinguished mathematicians from the University of Arizona and other institutions around the world. Coffee, tea, and

cookies are usually served beforehand. These events provide an opportunity to rub shoulders with faculty members and to see famous mathematicians in action.

Math Instruction Colloquium

This is a colloquium for anyone interested in mathematics education, which includes mathematics undergraduates, graduate students, post-docs, faculty, and local school teachers. Techniques, strategies, and course content in the teaching of mathematics are discussed by participants and by leading educators invited from the outside.

Graduate Student Colloquium

The math department graduate students organize a weekly colloquium, often on topics accessible to undergraduate students. The speakers are usually graduate students presenting aspects of their own research. The atmosphere is generally rather informal.

Applied Mathematics Brown Bag Colloquium

The graduate students in the Interdisciplinary Program in Applied Mathematics organize a weekly colloquium, often on topics accessible to undergraduate students. The speakers are usually graduate students presenting aspects of their own research. The atmosphere is generally rather informal.

Opportunities for Math Majors

Department-level Opportunities

Research Opportunities

Our Undergraduate Research Assistant (URA) program provides opportunities to earn money while engaging in research. You might furthermore have an opportunity to present your research at a conference such as SunMARC (<http://sunmarc.org/>).

Teaching Opportunities

Our Undergraduate Teaching Assistant (UTA) program provides opportunities to earn money while engaging in teaching-related activities.

Tutoring Jobs

The Center for Recruitment and Retention of Mathematics Teachers (<http://crr.math.arizona.edu/>) offers an opportunity to observe dynamic teaching, attend tutor preparation classes for a credit, and tutor middle and high school students for pay. Other locations on campus that offer tutoring services might also have job opportunities. For a current listing, see the math department tutoring page (<http://math.arizona.edu/tutoring/>).

University-level Opportunities

There exist many research-related and teaching-related opportunities on the UA campus. This page lists some of the more prominent of such activities.

The new University of Arizona Office of Undergraduate Research website (<http://ur.arizona.edu/>) can help you find research opportunities around the U of A, and will help you connect with projects in your area of interest.

Undergraduate Biology Research Program

To learn more, please visit the Undergraduate Biology Research Program website (<http://ubrp.arizona.edu/>).

UA NASA Space Grant Program

To learn more, please visit the NASA Space Grant Program website (<http://spacegrant.arizona.edu/opportunities/internships/>).

UA Summer Research Institute

This program, although run by the UA Graduate College, offers opportunities for undergraduate students. To learn more, please visit the Summer Research Institute website (<http://grad.arizona.edu/sri/>).

Teaching Teams Program

The primary goal of the Teaching Teams Program (TTP) is to improve learning on the campus of the University of Arizona. They do this through the creation of a Teaching Team which includes Instructors, Graduate Teaching Assistants (GTA's), and student peer assistants. These student peer assistants are called Preceptors. To learn more about becoming a Preceptor, see the Teaching Teams Program website (<http://teachingteams.arizona.edu/>).

UA Career Services

Besides offering job placement help for current UA students and alumni, UA Career Services (<http://www.career.arizona.edu/>) also assists current UA students in finding and landing internships and other career-related experiences.

Internships & Outside Programs

There exist many opportunities to spend a semester or a summer at another institution, government laboratory, or private company. For a partial listing, please see our Internships & Outside Programs webpage (<http://math.arizona.edu/ugprogram/opportunities/internships.html>). You might also check with the Math Center for ideas.

