



Mathematics

Mathematics is sometimes called the Queen of the Sciences. It is a field which serves science but also stands on its own as one of the greatest edifices of human thought.

Mathematics demands careful, rigorous, analytical reasoning. The intellectual development afforded by an undergraduate concentration in mathematics provides an excellent background for a wide variety of vocations. Graduates of the University of Michigan Department of Mathematics have gone on to successful careers in law,

medicine, politics, and business, as well as every aspect of science, computer science, technology, and of course mathematics itself. Some have chosen to get further education in mathematics or another field, but many have taken interesting and challenging positions in industry, business, and government directly after graduation.

Described below are some of the characteristic skills developed by mathematics majors as well as representative careers of graduates who majored in mathematics.

SKILLS & ABILITIES

The study of mathematics develops the ability to solve problems by careful logical analysis and the application of a succession of complex techniques. The mathematics student develops the skills to discover the essence of problems, synthesize general theories to address specific problems, and apply theories across a variety of situations. These skills characterize the mathematics graduate

as a problem-solver, whether simulating telecommunications networks, planning a marketing strategy, or projecting outcomes of public policy choices. Although these examples represent different professions, in each case the same abilities would be used. A representative selection of skills developed through the study of mathematics follows.

Problem Solving

- Defining problems
- Recognizing types of problems
- Testing hypotheses
- Applying theory to specific problems
- Perceiving patterns and structures
- Determining relevant or extraneous information
- Clarifying problems
- Identifying relationships between problems/solutions
- Generating solutions

Analysis

- Modeling complex systems
- Developing theories
- Projecting/forecasting results
- Assessing risks
- Analyzing results
- Comparing information/data
- Evaluating ideas/analytical methods
- Reasoning by analogy
- Thinking/reasoning abstractly

Communication

- Communicating abstract concepts
- Translating between written text and computations/formulas
- Describing processes in non-technical terms
- Explaining theories/ideas
- Summarizing findings
- Informing/instructing
- Contributing to teams

Technical/Computational

- Computer modeling
- Numerical simulation
- Analyzing statistics
- Program design
- Visualizing abstract shapes/patterns
- Applying quantitative analysis
- Maintaining precision and accuracy

OCCUPATIONAL OPPORTUNITIES

Many career paths are open to students who major in mathematics. The following list of occupational opportunities is based on surveys of Michigan graduates and na-

tional data. Those occupations marked with a • generally require additional graduate study.

Business/Industry	Finance/Banking	Research/Education	Government/Non-Profits
•Operations researcher Accountant Management consultant Chief information officer •C.E.O. Simulation modeler Operations manager Customer support and training supervisor Systems analyst Software engineer Programmer •Control systems engineer	Broker Actuarial analyst Life/P&C actuary Financial services manager Financial consultant •Chief financial officer Pension fund administrator Benefits specialist Health consultant Financial planner •Investment banker	•Research scientist •Mathematician •Physicist •Chemist •Atmospheric scientist •Brain researcher Teacher •Professor •College administrator •Medical researcher •Physician •Dentist Research associate •Biomathematician	Data analyst Demographer •Meteorologist •Cryptologist •Federal Reserve Bank economist Foundation executive •Grant administrator State budget director Social Security administrator •Public policy analyst •Lawyer Military officer

CURRICULUM REQUIREMENTS

The technological revolution demands a wide variety of mathematically skilled workers. The mathematics major therefore offers concentrations ranging from pure and honors mathematics, through applied mathematics (including actuarial science), to the teaching certificate. Each program requires courses selected from appropriate subareas of mathematics. There is substantial choice among the specialized and cognate courses allowing the student to focus on specific interests, including pure mathematics, discrete and algorithmic methods, numerical and applied analysis,

operations research and modeling, probabilistic methods, mathematical economics, control systems, mathematics of finance and risk management, mathematical physics and mathematical biology.

Consult the brochure Undergraduate Programs, Department of Mathematics or the website <http://www.math.lsa.umich.edu/undergrad> for complete information on course offerings and program requirements.

FOR MORE INFORMATION

For information about choosing a career; about graduate/professional school, internships, or job descriptions; and for library resources:

The Career Center
3200 Student Activities Building
(734) 764-7460
www.careercenter.umich.edu

For general information about choosing a major and about concentration and degree requirements:

LS&A Academic Advising Center
1255 Angell Hall
(734) 764-0332

For information about concentration and degree requirements, career opportunities, graduate schools, and other aspects of the field of mathematics:

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www.math.lsa.umich.edu/undergrad
www.math.lsa.umich.edu/career