

Mathematics

What is the Mathematics major?

Math majors develop the ability to explore, conjecture, and reason logically, as well as use mathematical methods to solve problems. Mathematics is both a discipline and a tool used extensively in the sciences, medicine, engineering, and industry. Mathematicians have a romance with numbers. They deal with the hard realities of statistics and the fragile beauty of complex theorems. Mathematics majors study exactly what you'd expect: lots and lots of math. Some programs offer opportunities to combine a degree in mathematics with one in business, economics, physics, or computer science.

Occupational opportunities

There is a steady, strong demand for math majors. Many employers (as well as graduate schools in professions such as law and medicine) will give preferential treatment to graduates with a degree in math. The study of mathematics is excellent preparation for a host of employment opportunities in business, finance, insurance, communications, electronics, scientific research of any type, and any field that has challenging problems to solve. With graduate degrees, one can have a career in actuarial science, medicine, law, college teaching, or mathematics research. Some of the career paths

Business/Industry

- Management consultant
- Chief information officer
- Simulation modeler
- Operations manager
- Systems analyst
- Software engineer
- Programmer

Graduate Study Required

- Operations researcher
- Accountant

Research and Education

- Research associate

Graduate Study Required

- Research scientist
- Mathematician
- Physicist
- Chemist
- Atmospheric scientist
- Teacher
- Professor
- Medical researcher
- Physician

Finance/Banking

- Broker
- Actuarial analyst
- Financial services manager
- Financial consultant
- Pension fund administrator
- Benefits specialist
- Health consultant
- Financial planner

Graduate Study Required

- Chief financial officer

Government/Non-Profits

- Data analyst
- Demographer
- State budget director
- Social security administrator

Graduate Study Required

- Meteorologist
- Cryptologist
- Grant administrator
- Public policy

Career Snapshot: Operations Research Analyst

Opportunities for operations research analysts exist in almost every industry because of the diversity of applications for their work. The duties of the operations research analyst vary according to the structure and management philosophy of the employer or client. Some firms centralize operations research in one department; others use operations research in one department; others use operations research in each division. In general, analysts begin by looking at a general problem that is presented by management. They break the problem into components and decide upon the most relevant analytic technique to use to solve the problem. Analysts can use any of several techniques, including simulation, linear and nonlinear programming, dynamic programming, queuing and stochastic-process models, etc. Nearly all of these techniques, however, involve the construction of a mathematical model that attempts to describe the system being studied. Operations research analysts generally work regular hours in an office environment. Because they work on projects that are of immediate interest to top management, operations research analysts are often under pressure to meet deadlines and work more than a 40-hour week.

Skills and Abilities

Analysis

- Modeling complex systems
- Developing theories
- Projecting and forecasting results
- Assessing risks
- Analyzing results
- Comparing information/data
- Evaluating ideas/analytical methods

Communication

- Communicating abstract concepts
- Translating between written text and computations
- Describing processes in non-technical terms
- Explaining theories/ideas
- Summarizing findings

Technical/Computational

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

Problem Solving

- Defining problems
- Testing hypotheses
- Perceiving patterns and structures
- Determining relevant or extraneous information
- Clarifying problems
- Identifying relationships between problems/solutions

Additional Resources

U.S. Government's Occupational Outlook Handbook
<http://stats.bls.gov/oco>

The Mathematical Association of America (MAA)
1529 18th Street, N.W.
Washington, DC 20036-1385
(800) 741-9415
www.maa.org

American Mathematical Society
201 Charles Street
Providence, RI 2904
(800) 321-4267
www.ams.org

American Statistical Association
www.amstat.org

National Council of Teachers of Mathematics
www.nctm.org

Society of Actuaries
www.soa.org

IEEE Computer Society
www.computer.org

Society for Industrial and Applied Mathematics
www.siam.org