

# APPLIED MATHEMATICS BS

## CAREER OVERVIEW FOR STUDENTS



Along with rapid increases in technology and specialization in businesses and industry many employers have increased needs for people whose key functions are to develop/apply mathematically-based solutions to challenging “real-world” problems. Although such people have a wide variety of job titles they typically utilize both complex mathematical theories/techniques and powerful computer technologies. RIT’s Applied Mathematics program combines mathematics with a chosen **program concentration** in a related application field. Some of the many minors that are available are: actuarial science, biology, biostatistics, business, chemistry, economics, engineering, imaging science, operations research, physics, and premedical studies. Graduates of the Applied Mathematics program work in high-technology industry, business, federal agencies, and medical research laboratories. Many earn advanced degrees in mathematics or a related field.

### Course Descriptions for Applied Mathematics:

[http://www.rit.edu/programs/program\\_detail.php?id=609](http://www.rit.edu/programs/program_detail.php?id=609)

### Degree(s) Awarded

Bachelor of Science in Applied Mathematics

Bachelor of Science in Applied Mathematics & MBA (dual degree program)

Bachelor of Science in Applied Mathematics & Master of Science in Applied Mathematics (dual degree program)

### Enrollment

Approximately 110 students are enrolled.

### Cooperative Education Component

Students are eligible to participate in an optional co-op program upon completion of 2<sup>nd</sup> year courses. Participation is strongly encouraged.

### Salary Information (Avg/Range)

Co-op:	\$16.72	\$10.00-21.50
*BS:	\$62,932	\$55,000-70,000

\*Statistics from the Nat’l Assn. Of Colleges & Employers (NACE) for 2010-2011 graduates

### Equipment & Facilities

Students have access to programming, statistical and simulation languages, graphics software and design tools on a variety of platforms. Symbolic computation and statistical laboratories are also available.

### Student Skills & Capabilities

- Formulating, modeling and solving problems; data analysis
- Computing Skills:
  - Software: Mathematica, MATLAB, Maple, Minitab
  - Language: Java
  - Operating systems: UNIX, VMS, Mac OS, Windows
- Communication; working in teams
- Students have a focus in the principal areas of analysis including calculus, differential equations, real variables, probability, and statistics, along with significant coursework in the discrete areas of mathematics including matrix, linear, and abstract algebra. In addition, students have many opportunities to pursue independent study or undergraduate research under the guidance of faculty members.

## Nature of Work

Mathematicians use mathematical theory, computational techniques, algorithms, and the latest computer technology to solve economic, scientific, engineering, physics, and business problems. The work of mathematicians falls into two broad classes — theoretical (pure) mathematics and applied mathematics. These classes, however, often overlap. Applied mathematicians start with a practical problem, envision its separate elements, and then reduce the elements to mathematical variables. They often use computers to analyze relationships among the variables, and they solve complex problems by developing models with alternative solutions. (Source: U.S. Bureau of Labor Statistics Occupational Outlook Handbook)

## Training/Qualification

A Ph.D. degree in mathematics usually is the minimum education needed for prospective mathematicians, except in the Federal Government. In the Federal Government, entry-level job candidates usually must have a 4-year degree with a major in mathematics or a 4-year degree with the equivalent of a mathematics major. Outside the Federal Government, bachelor's degree holders in mathematics usually are not qualified for most jobs, and many seek advanced degrees in mathematics or a related discipline. However, bachelor's degree holders who meet State certification requirements may become primary or secondary school mathematics teachers. The majority of those with a master's degree in mathematics who work in private industry do so not as mathematicians but in related fields. For jobs in applied mathematics, training in the field in which mathematics will be used is very important. Mathematics is used extensively in physics, actuarial science, statistics, engineering, and operations research. Computer science, business and industrial management, economics, finance, chemistry, geology, life sciences, and behavioral sciences are likewise dependent on applied mathematics. Mathematicians also should have substantial knowledge of computer programming, because most complex mathematical computation and much mathematical modeling are done on a computer. (Source: U.S. Bureau of Labor Statistics O.O.H.)

## Job Outlook

Employment of mathematicians is expected to grow much faster than the average. However, keen competition for jobs is expected. Employment of mathematicians is expected to increase by 16 percent during the 2010–20 decade. Advancements in technology usually lead to expanding applications of mathematics, and more workers with knowledge of mathematics will be required in the future. (Source: U.S. Bureau of Labor Statistics O.O.H.)

## Job Titles

[Note: Most often the work involving applied mathematics is done by persons whose titles are *other than* “mathematician”] Engineer, Economist, Analyst (e.g. Operations Research), Physicist, Cryptanalyst (codes), Actuary, Teacher, Market Researcher, Financial Advisor

## Significant Points

- A Ph.D. in mathematics usually is the minimum educational requirement, except in the Federal Government.
- Master's degree and Ph.D. holders with a strong background in mathematics and a related field, such as computer science or engineering, should have better employment opportunities in related occupations. (Source: U.S. Bureau of Labor Statistics O.O.H.)

## Employment

Mathematicians held about 3,000 jobs in 2010 (many people with mathematical backgrounds worked in other occupations). Many mathematicians work for federal or state agencies. The Dept. of Defense accounts for about 81% of the mathematicians employed by the Federal Government. In the private sector mathematicians are employed by scientific R&D services, software publishers, insurance companies, and in aerospace or pharmaceutical manufacturing. (Data Source: U.S. Bureau of Labor Statistics Occupational Outlook Handbook)

## Selected Employers of RIT Applied Mathematics Co-op and Graduating Students:

Blue Cross/Blue Shield, Center for Army Analysis, CIGNA Healthcare, Citigroup Inc., Cognigen Corp., Eastman Kodak, Epic, Global Crossing Telecommunications Inc., Harbridge Consulting Group, Harris Interactive Inc., Institute for Defense Analyses, KJT Group, LMI, NASA, National Geospatial-Intelligence Agency, National Security Agency, Ortho-Clinical Diagnostics, Sigma Marketing, U.S. Census Bureau, Xerox Corp.

## Contact Us:

We appreciate your interest in your career and we will make every effort to help you succeed. Feel free to contact Kara Leonard and Lisa Monette, the program coordinators who work with the Applied Mathematics program. For your convenience, you can access information and services through our web site at <http://www.rit.edu/co-op/careers>.

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