Overview of the Major Tracks

Mathematics belongs both to liberal arts and to sciences. It is not only the language of science (including social science), but also studied for its own beauty. It is therefore one of the most vital and lively subjects in the University curriculum.

The Undergraduate Program of the Department of Mathematics and Statistics include five major degree options that lead to the following three major tracks.

The common preliminary lower-level courses required for all the five math major options are calculus I–III (Math 224/225, Math 226/227 or Math 230, and Math 323) , linear algebra (Math 304), and number systems (Math 330). Read the University Bulletin for a very comprehensive and detailed official description about the coursework requirements for each of the five major degree options.

Mathematics Tracks (BA/BS)

The BA in Mathematical Sciences allows each student to flexibly customize a course of study to meet his or her individual needs and interests, emphasizing either the *breadth* or *depth*. The student is encouraged to gain experience in different areas of mathematics. Core areas of Mathematics include Analysis, Algebra and Geometry/Topology. Other areas include Actuarial Science, Statistics, Combinatorics, Computer Science, and others. A student is required to finish one upper-level course from each of the three core areas, and two additional upper-level courses. To obtain a BA degree in in mathematical sciences with a mathematics track, a student must complete a minimum of 40 credits of coursework.

The challenging BS degree program provides excellent preparation for graduate studies. Students considering a BS degree should seek advice from their academic advisors as early as possible and plan their schedules carefully to meet the demanding requirements. To obtain a BS degree in mathematical sciences with a mathematics track, a student must complete a minimum of 64 credits of coursework.

Statistics Track (BA)

Statistics is the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data, in the context of uncertainty. Statistics is primarily mathematics in nature but has grown through applications in the social sciences, natural sciences, as well as business and engineering, to become its own separate, though closely allied, field.

The BA track in Statistics is designed to provide a solid mathematical and statistical foundation for a successful career related to statisticians, data analysts, and data scientists. It offers students the possibility of expanding the interdisciplinary aspect of the program by completing a second major. For example, students may combine statistics with computer science, biology, psychology, economics, accounting, finance, management science, or

social science.

To obtain a BA degree in mathematical sciences with a statistics track, a student must complete 50 credits of coursework.

Actuarial Tracks (BA/BS)

The track in Actuarial Science is designed to prepare students for an actuarial career. Actuaries use probability models to quantify uncertainty and risk in business problems. Actuaries assemble and analyze data related with risks to answer questions such as how much to charge policy-holders for auto, life or health insurances, how to set up retirement plans, how to formulate investment strategies in light of future risks. They provide an evaluation of risk for their companies for strategic decisions.

Because of the crucial role in such decision making, actuaries are rewarded accordingly; salaries offered to actuaries are substantial, and there is ample opportunity for advancement in the actuarial profession. Moreover, actuarial careers often lead to upper management and executive positions.

Refer to the Math department section on actuarial sciences for more detailed information.

Professional advancement results from passing a series of examinations administered by the actuarial societies and by the completion of specific courses approved by the actuarial societies. The BA track in Actuarial Science requires 10.5 courses in Mathematical Sciences (that is 10 full-semester courses and one half-semester course) and 2 courses in Economics.

To obtain a BA degree in mathematical sciences with an actuarial science track, a student must complete 42 credits of coursework, including 10.5 courses in Mathematical Sciences and two courses in Economics. The BS degree with an actuarial science track requires 58 credits of coursework, including 14.5 courses in Mathematical Sciences and 4 courses in Economics.

Future Career Paths

In the technology-oriented climate of today, mathematicians and statisticians have excellent employment opportunities. Our graduates are employed not only in mathematics teaching and research, and in the traditional fields of physics, chemistry, computer science, and engineering, but also, and increasingly, in business, economics, environmental sciences, geology, biology and the health sciences among others.

The following websites below provide some resources on the career perspective for math and stats graduates.

- What Do Mathematicians Do?
- What Do Statisticians Do?
- What Do Actuaries Do?

Mathematics Teachers

For students who are interested in becoming math teachers, Binghamton offers:

- An undergraduate minor in Education
- A Master of Arts in Teaching (MAT) in Mathematics Adolescent Education; Either the BA (Mathematics Track) or BS (Mathematics Track) is suitable for preparing this MAT program.
- Here is a list of recommended courses for future math teachers.

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https://www2.math.binghamton.edu/ - **Department of Mathematics and Statistics, Binghamton University**

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