

**HANDBOOK
FOR THE
APPLIED DISCRETE
MATHEMATICS OPTION**

**Department of Mathematics
Virginia Polytechnic Institute & State University**

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THE APPLIED DISCRETE MATHEMATICS OPTION

The **Applied Discrete Mathematics (ADM) Option** is one of the four options or paths toward a B.S. in Mathematics offered at Virginia Tech, the others being (1) the *Traditional Option*, (2) *Mathematics Education Option*, and (3) the *Applied Computational Mathematics Option*. As computer power and applications have evolved, the importance of combinatorics and discrete mathematics has grown tremendously. Techniques that employ combinatorics and discrete mathematics are being used in almost every area where mathematical computations are found. In response to this area's increased importance and utility, the Department has developed the ADM Option, in which the student is given exposure to fundamental ideas and techniques in discrete mathematics and combinatorics. Since computers are central in these applications we also require the students in this option to develop a strong foundation in Computer Science.

The ADM Option is designed to allow students either to enter the job market after their undergraduate years or to continue their studies at a graduate-degree level. Those students who wish to begin work after their undergraduate degree will have training in combinatorial techniques, including graph theory (used in electrical circuits, optimization problems among many other areas), number theory (basic to coding theory and algorithm development), counting techniques (employed in almost every area where mathematics is applied), and general algebraic theories (providing the student with a strong abstract mathematical foundation). A student completing the ADM Option will be employable in many different capacities. For example, our students would be prepared to work for the National Security Agency (which employs many mathematicians and is interested in applications of coding theory), software development companies, engineering companies that need software development, and research laboratories such as Bell Laboratories and IBM Laboratories. Students who complete the ADM Option will have both the mathematical sophistication to handle abstractions and a firm grounding in applicable techniques. These skills will be enhanced by a strong background in the use of computers that will include programming proficiency.

For those students who wish to continue their education, the ADM Option requires the student to complete the basic mathematics courses that are required for admission to most graduate programs in mathematics. By adding three additional credits in Computer Science, students can obtain a minor in that area, and possibly continue on to graduate school in Computer Science.

For additional information on the ADM Option, you should contact Nick Loehr (nloehr@vt.edu). For information concerning aspects that uniformly affect all four Mathematics undergraduate degree options, you should examine the [Handbook for All Math Majors](#) (available on the math department advising website). These topics include scholarships, advising, University and College of Science Curriculum for Liberal Education and Pathways requirements, course content explanations, the Honors Program, dual majors, minors, the Cooperative Education Program, undergraduate activities, mathematics competitions, job placement, and preparation for graduate school.