MAJOR

BACHELOR OF SCIENCE IN
APPLIED MATHEMATICS

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
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MAJOR ADVISORS
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See all major requirements at: **www.jjay.cuny.edu/applied-mathematics-major-resources**

WHAT WILL YOU LEARN IN THIS MAJOR?

The major has two concentrations, Data Science and Cryptography. In the Data Science concentration you will learn the principles of data representation, big data management, and statistical modeling. In addition, you will learn how to use computing science to reveal hidden causal and temporal relationships in large data sets. The capstone course (MAT 455-Data Analysis) will prepare students for experiential learning opportunities through partnerships with the public and private sectors that furnish real time situations for analysis. In the Cryptography concentration, you will learn to secure information by assuring privacy as well as other properties of a communications channel such as data integrity, authenticity, and non-repudiability. You will learn to devise systems to resist the unwarranted intrusions of hackers, to protect data sets, and to act as consultants concerning the implementation of cryptographic methods.

IN THIS MAJOR YOU WILL ▪▪▪

Apply the mathematical modeling process to modern problems in data science and cryptography for the purpose of analyzing large data sets and encrypting plaintext or decrypting cipher text.

Function effectively in an interdisciplinary team environment and express quantitative information effectively to others.

Identify and adhere to the ethical constraints of respecting personal data privacy and evaluate and assess ethical standards for the application of cryptographic algorithms in contemporary contexts.

Apply the principles of mathematical proof and deductive logic to prove mathematical statements or create counterexamples within the context of the real number axioms and the axioms defining various algebraic structures.

FIRST COURSES IN THE MAJOR ▪▪▪

MAT 151: Calculus I

MAT 152: Calculus II

MAT 265: Elements of Mathematical Proof

CSCI 171: The Nature of Computers and Computing

CSCI 172: Introduction to Data Science

WHAT CRITICAL THINKING SKILLS WILL YOU DEVELOP IN THIS MAJOR?

- Use mathematical methods to analyze and recognize the properties of large data sets as well as any anomalies.

- Recognize clustering in large data sets and explain its significance.

- Use the mathematics upon which specific cryptographic algorithms are based to analyze the strengths and weaknesses of cryptographic schemes.

- Develop cryptographic algorithms.

- Be prepared for a lifetime of learning that is an integral part of being a professional mathematician.

WHAT MINOR MIGHT BE A GOOD COMPLEMENT TO THIS MAJOR?

- Computer Science and Information Security

- Economics

- Security Management

- Public Administration

For more information about minors, go to:
www.jjay.cuny.edu/minors

WHAT OPPORTUNITIES WILL THIS MAJOR OFFER YOU?

- Students will complete a capstone course that provides both the knowledge and the experience required for entry level employment. Regardless of concentration, the capstone course is structured around a sequence of increasingly complex projects that are drawn from real life case studies. The requirement to describe analyses and conclusions in report form will enhance written communication skills and the need to do literature searches will improve information literacy skills.

- You will be well prepared to enroll in a wide range of Masters and Doctoral programs such as Digital Forensics and Cyber Security, Statistics, Financial Mathematics, Machine Learning, traditional Mathematics, and Mathematics Education.

- Students may participate in the college's PRISM program which provides financial incentives to students to participate in faculty-mentored research projects. It also sponsors seminars and short courses to promote student research; supports student travel to scientific conferences; and funds the purchase of research supplies and equipment for student research projects.

- You will be able to voluntarily participate in a one day seminar during the winter and summer recesses that is devoted to case study based problem solving, discussions of current research, and contemporary topics of student interest.

THIS MAJOR CAN BE A GREAT FOUNDATION FOR A WIDE RANGE OF JOBS, BUT SOME POSSIBILITIES TO CONSIDER ARE:

Data Analysis
- Data Scientist
- Data Analyst
- Data Engineer
- Actuary

Cryptography
- Systems Security Engineer
- Cyber Security Specialist
- Software Security Engineer
- Information Security Engineer
- Technology Risk-Application Security Architect
- Blockchain Engineer