MS Degree in Applied & Computational Mathematics

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rit.edu/study/applied-and-computational-mathematics-ms

What & Why

- What do you get out of MS degree
  - Advanced understanding of mathematics
  - In-depth knowledge of a particular branch
  - Advanced training and skills

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  - Advanced understanding of mathematics
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- Why should you pursue MS degree
  - You love math, and want to learn more
  - You are not sure if you want to pursue a PhD, thus you want to see if graduate school is right for you
  - You want to gain additional skills for career
  - You gain experience

Careers

- Areas
  - Pursue PhD
  - Actuary
  - Investment/Quantitative analyst
  - Sports analysis
  - Teaching
  - Operations research analyst
  - Statistician
  - Data scientist/analyst

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- Recent Alumni
  - Software Engineer – Microsoft
  - Data Science & Analytics – Daimler Trucks North America
  - Lecturer – University of Rhode Island
  - Basketball Operations Analyst – Sacramento Kings
  - Pursuing PhD in Math Modeling at RIT

Curriculum

- Thesis option
  - 30 credits
  - Grad Seminar I & II
  - 3 Core Courses
  - *4 Electives*
  - *7 Research Credits*
  - *Thesis defense*
- Project option
  - 30 credits
  - Grad Seminar I & II
  - 3 Core Courses
  - *5 Electives*
  - *4 Research Credits*

Core Courses

- MATH601 – Methods of Applied Math
- MATH602 – Numerical Analysis I
- MATH605 – Stochastic Processes
- MATH622 – Math Modeling I
- MATH645 – Graph Theory
- MATH722 – Math Modeling II

Math Electives

https://digitalarchive.rit.edu/xmlui/bitstream/handle/1850/21276/Graduate_Course_Descriptions2018.pdf?sequence=1

- MATH625 – Applied Inverse Problems
- MATH631 – Dynamical Systems
- MATH633 – Measure Theory & Elements of Functional Analysis
- MATH646 – Combinatorics
- MATH655 – Biostatistics
- MATH671 – Number theory
- MATH702 – Numerical Analysis II
- MATH712 – Numerical Methods for PDEs
- MATH731 – Advanced Dynamical Systems
- MATH735 – Mathematics of Finance I
- MATH736 – Mathematics of Finance II
- MATH741 – Partial Differential Equations I
- MATH742 – Partial Differential Equations II
- MATH761 – Mathematical Biology
- MATH771 – Mathematics of Cryptography
- MATH789 – Special Topics: e.g., high-performance computing, deep learning, complex systems
- MATH831 – Mathematical Fluid Dynamics

Non-Math Electives

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- STAT611 – Statistical Software
- STAT631 – Foundations of Statistics
- DSCI633 – Foundations of Data Science
- CSCI662 – Foundations of Cryptography
- CSCI665 – Foundations of Algorithms
- CSCI762 – Advanced Cryptography
- ISEE601 – Systems Modeling & Optimization
- MECE605 – Finite Elements
- MECE725 – Fundamentals of CFD

Sample curricula

- **Financial Math**:
  - MATH 606 & 607
  - MATH 605, 622, 722
  - MATH 735, 736
  - STAT 611, 631
- **Crypto:**
  - MATH 606 & 607
  - MATH 622, 645, 722
  - MATH 646, 671, 771
  - CSCI 662, 665
- **Computational science**:
  - MATH 606 & 607
  - MATH 602, 605, 645
  - MATH 702, 712, 789(HPC)
  - CSCI 665
- **Industrial math:**
  - MATH 606 & 607
  - MATH 602, 622, 722
  - MATH 601, 631, 741
  - STAT 611
  - ISEE 601
- **PhD**:
  - MATH 606 & 607
  - MATH 602, 605, 645
  - MATH 631, 633, 646, 741
  - Thesis

Research Areas

In Grad Seminar I, SMS faculty will give brief overviews of their research.
Additionally, a literature review is conducted, usually under the guidance of a selected faculty member.
In grad seminar II, a research proposal is created.

- **Discrete Math**:
  - Network science
  - Image analysis
- **Biomedical Math**:
  - Contact lens
  - Imaging
- **Fluid Dynamics**:
  - Polymeric flows
  - Coating
- **Earth Systems Science**:
  - Lake plastic
  - Climate modeling
- **CCRG:**
  - Relativity
  - Multi-messenger astrophysics
- **Statistics**:
  - Data analytics
  - Machine learning

Questions?

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