**Mission Statement of the Mathematics Graduate Program at Yeshiva University**

The mission of the math graduate program is to prepare our graduates for pursuing advanced degrees, academic careers, or high-skilled professions in applied mathematics, financial services and investment, industry, insurance companies, and computer information and software,.

Included in the program are concentrations in dynamical systems, partial differential equations, financial mathematics, mathematical physics, and scientific computing. The program is modeled on an apprenticeship in which students’ mathematical knowledge and skills are acquired and developed through contact with problems and applications under the supervision of highly active research faculty mentors.

1. Students are required to complete four of the following courses.
   1. Topics in Foundations of Mathematics MAT-5220
   2. Introduction to Analysis MAT-5300/ Functions of a Real Variable MAT-5301
   3. Functions of a Complex Variable MAT-5405
   4. Topology MAT-5310
   5. Algebra MAT-5330
   6. Differential Geometry MAT-5250
   7. Mathematical Statistics MAT-5110
2. Students must choose six elective courses. A partial list of elective courses are listed below but the course offerings each semester may differ.
3. Ordinary Differential Equations MAT-5302
4. Partial Differential Equations MAT-5340
5. Functional Analysis MAT-5510
6. Dynamical Systems MAT-5401
7. Mathematical Modeling MAT-5100
8. Topics in Applied Mathematics MAT-5160
9. Scientific Computing MAT-5400
10. Topics in Topology MAT-5390
11. Mathematics of Finance MAT-5640
12. Complex Systems MAT-5491
13. Students must write a Master Thesis in Mathematics – MAT-8970

Students can earn a Master of Arts degree, or may apply to continue their studies in our PhD Program in Mathematical Sciences.

**Goals and objectives:**

**Goal 1:** Students will be able to exhibit an integrated knowledge in the fundamental areas of advanced mathematics: analysis, geometry and topology, algebra, and mathematical statistics.

* Objective 1-A: Students will be able to demonstrate a rigorous understanding of definitions, theorems, and fundamental techniques in advanced mathematics.
* Objective 1-B: Students will be able to demonstrate the ability to construct complete formal arguments and to write proofs of theorems.
* Objective 1-C: Students will be able to use definitions, theorems, and techniques learned to solve new mathematical problems.

**Goal 2:** Students will demonstrate the ability to apply advanced mathematical concepts and tools in specialized areas of ordinary and partial differential equations, dynamical systems, computational topology, functional analysis, mathematical physics, probability and statistics, complex systems, financial mathematics, scientific computing, and others.

* Objective 2-A: Students will be able to apply mathematics to a broad spectrum of complex problems.
* Objective 2-B: Students will be able to develop and analyze mathematical models for real-life systems.
* Objective 2-C. Students will be able to use the computer for simulation and visualization of mathematical ideas and processes.

**Goal 3:** Students will be able to communicate mathematical ideas and present mathematical arguments both in writing and orally using proper use of mathematical notation and terminology.

* Objective 3-A: Students will be able to read, write, listen, and speak mathematically.
* Objective 3-B: Students will be able to read and synthesize technically-based materials from multiple perspectives, and make connections with other areas.
* Objective 3-C: Students will be able to conduct mathematical research and/or create and document computer algorithms.

**Curriculum map**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SLOs**   |  | | --- | |  |  |  | | --- | |  | | Courses/Learning Experiences | | | | | | | | | | |  |
| **MAT -5300**  **/5301**  **Real Var** | **MAT - 5405**  **Cplx**  **Var** | **MAT -5310 Top** | **MAT**  **- 5330**  **Alg** | **MAT**  **-**  **5250 Diff Geom** | **MAT**  **-5110 Math Stat** | **MAT**  **-**  **5302**  **ODE** | **MAT**  **- 5340 PDE** | **MAT - 5401**  **Dyn Sys** | **MAT**  **-**  **5640**  **Math**  **Fin** | **MAT**  **- 5491**  **Cplx**  **Sys** | **MAT**  **-**  **8970 Thesis**  **Res** |
| **1-A** | X | X | X | X | X |  |  |  |  |  |  |  |
| **1-B** | X | X | X | X | X |  |  |  |  |  |  |  |
| **1-C** | X | X | X | X | X |  |  |  |  |  |  |  |
| **2-A** |  |  |  |  |  | X | X | X | X | X | X |  |
| **2-B** |  |  |  |  |  | X | X | X | X | X | X |  |
| **2-C** |  |  |  |  |  | X | X | X | X | X | X |  |
| **3-A** |  |  |  |  |  |  |  |  | X | X | X | X |
| **3-B** |  |  |  |  |  |  |  |  | X | X | X | X |
| **3-C** |  |  |  |  |  |  |  |  | X | X | X | X |