

Concentration Requirements

Applied Mathematics

Math 4640 Numerical Analysis I
Math 4347 Partial Differential Equations I
Math 4541 Dynamics and Bifurcations I

Three of:

Math 4348 Partial Differential Equations II
Math 4542 Dynamics and Bifurcations II
Math 4580 Linear Programming OR ISyE 3133/3833 Engineering Optimization
Math 4581 Classical Mathematical Methods in Engineering
Math 4641 Numerical Analysis II
Math 4699 Undergraduate Research (on an approved topic related to the concentration; can only be used once toward the concentration requirement)
Math 4755 Mathematical Biology
Math 4777 Scientific Computing
Math 4782 Quantum Information and Quantum Computing
CX4140 Computational Modeling Algorithms
CX4240 Computational Data Analysis

Discrete Mathematics

CS 3510/3511 Design & Analysis of Algorithms
Math 4022 Graph Theory
Math 4032 Combinatorial Analysis

One of:

ISyE 3133/3833 Engineering Optimization **OR** Math 4580 Linear Programming

Two of:

Math 4150 Intro to Number Theory
Math 4699 Undergraduate Research (on an approved topic related to the concentration; can only be used once toward the concentration requirement)
CS 4510 Automata & Complexity Theory
CS 4540 Advanced Algorithms

ISyE 4133 Advanced Optimization

Probability and Statistics

Math 3236 Statistical Theory **OR** Math 4261 Mathematical Statistics I
Math 4221 Stochastic Processes I

Four of:

Math 4222 Stochastic Processes II
Math 4255 Monte Carlo Techniques
Math 4262 Mathematical Statistics II
Math 4280 Intro to Information Theory
Math 4580 Linear Programming **OR** ISyE 4133 Advanced Optimization
Math 4699 Undergraduate Research (on an approved topic related to the concentration; can only be used once toward the concentration requirement)
CX 4240 Computational Data Analysis **OR** CS 4641 Machine Learning

Pure Mathematics

Math 4318 Real Analysis II

One of:

Math 4108 Abstract Algebra II
Math 4150 Intro to Number Theory

One of:

Math 4431 Introduction to Topology
Math 4432 Intro to Algebraic Topology
Math 4441 Differential Geometry

Three courses from the following list (must be different from the courses used to satisfy the above requirements):

Math 4022 Intro to Graph Theory
Math 4032 Combinatorial Analysis
Math 4108 Abstract Algebra II
Math 4150 Intro to Number Theory
Math 4221 Stochastic Processes I
Math 4222 Stochastic Processes II
Math 4347 Partial Differential Equations I
Math 4348 Partial Differential Equations II

Math 4431 Introduction to Topology
Math 4432 Intro to Algebraic Topology
Math 4441 Differential Geometry
Math 4541 Dynamics and Bifurcations I
Math 4542 Dynamics and Bifurcations II
Math 4699 Undergraduate Research (on an approved topic related to the concentration; can only be used once toward the concentration requirement)

NOTES:

1. Students may not list more than one concentration on their transcript.
2. Concentration requirements may also be used to satisfy the requirements for the B.S. in Mathematics.