

# APPLIED MATHEMATICS CONCENTRATION

MATH 304	Vector Analysis	4
MATH 344	Linear Analysis II	4
MATH 350	Mathematical Software	4
or CSC/CPE 202	Data Structures	
MATH 410	Complex Analysis I	4
MATH 413	Introduction to Analysis II	4
MATH 416	Differential Equations II	4
or MATH 418	Partial Differential Equations	
MATH 451	Numerical Analysis I	4
STAT 301	Statistics I	4
or STAT 305	Introduction to Probability and Simulation	

## Tracks

Select courses from one of the following tracks. <sup>1,2</sup> 12

### Track A

MATH 335	Graph Theory
MATH 341	Theory of Numbers
MATH 406	Linear Algebra III
MATH 411	Complex Analysis II
MATH 414	Introduction to Analysis III
MATH 416	Differential Equations II
MATH 418	Partial Differential Equations
MATH 435	Discrete Mathematics with Applications I
MATH 437	Game Theory
MATH 452	Numerical Analysis II
MATH 453	Numerical Optimization
MATH 460	Senior Project Applied Seminar
MATH 461 & MATH 462	Senior Project I and Senior Project II
MATH 476	Advanced Topics in Applied Mathematics
MATH 482	Abstract Algebra II
MATH 483	Abstract Algebra III

### Track B

DATA 301	Introduction to Data Science
DATA 401 & DATA 403	Data Science Process and Ethics and Data Science Projects Laboratory <sup>3</sup>
MATH 335	Graph Theory
or MATH 435	Discrete Mathematics with Applications I
or MATH 453	Numerical Optimization

## Approved Electives 12

Select three courses in one of the following categories, with at least one course at the 300-level or above. <sup>4,5</sup>

### Physics Category:

ASTR 301	Planetary Systems
ASTR 302	Stars and Galaxies
ASTR 326	Cosmology
PHYS 142	General Physics II

or PHYS 143	General Physics III
PHYS 211	Modern Physics I
PHYS 301	Thermal Physics I
PHYS 305	Classical Mechanics I
PHYS 306	Classical Mechanics II
PHYS 313	Introduction to Atmospheric Physics
PHYS 314	Ocean Dynamics
PHYS 318	Special Theory of Relativity
PHYS 323	Optics
PHYS/CPE 345	Quantum Computing
PHYS 405	Quantum Mechanics I
PHYS 408	Electromagnetic Fields and Waves I
PHYS 425	Solid State Physics
PHYS 428	Nonlinear Dynamical Systems

### Statistics Category:

STAT 302	Statistics II
STAT 305	Introduction to Probability and Simulation
STAT 323	Design and Analysis of Experiments I
STAT 330	Statistical Computing with SAS
STAT 331	Statistical Computing with R
STAT 334	Applied Linear Models
STAT 416	Statistical Analysis of Time Series
STAT 417	Survival Analysis Methods
STAT 418	Categorical Data Analysis
STAT 419	Applied Multivariate Statistics
STAT 421	Survey Sampling and Methodology
STAT 423	Design and Analysis of Experiments II
STAT 425	Probability Theory
STAT 426	Estimation and Sampling Theory
STAT 427	Mathematical Statistics

### Computer Science Category:

CSC/CPE 202	Data Structures
CSC/CPE 203	Project-Based Object-Oriented Programming and Design
CSC 225	Introduction to Computer Organization
CPE 345	Quantum Computing
CSC 349	Design and Analysis of Algorithms
CSC/CPE 357	Systems Programming
CSC 365	Introduction to Database Systems
CSC 448	Bioinformatics Algorithms

### Mechanical Engineering Category:

ME 211	Engineering Statics
ME 212	Engineering Dynamics
ME 302	Thermodynamics I
ME 326	Intermediate Dynamics
ME 341	Fluid Mechanics I

### Economics Category:

ECON 311	Intermediate Microeconomics I
ECON 312	Intermediate Microeconomics II
ECON 313	Intermediate Macroeconomics
ECON 403	Industrial Organization

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ECON 408	Mathematical Economics
ECON 409	Probability Models for Economic Decisions
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<b>Total units</b>	<b>56</b>

- <sup>1</sup> Only students in the Applied Mathematics concentration who are pursuing a Data Science minor should select Track B.
- <sup>2</sup> Students who select Track B should select Approved Electives from the Statistics Category that will fulfill prerequisites for courses in the Data Science minor.
- <sup>3</sup> DATA 401 and DATA 403 must be taken concurrently with DATA 402.
- <sup>4</sup> Consultation with advisor is recommended prior to selecting Approved Electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
- <sup>5</sup> Other choices are also possible, and should be pre-approved in consultation with an academic advisor. Approved Electives are to be taken outside of the Mathematics department and should have significant applications to mathematics.