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
or MATH 453 Numerical Optimization
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
or MATH 453 Numerical Optimization

Tracks

Select courses from one of the following tracks. 1,2 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 Senior Project I
& MATH 462 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 Science Process and Ethics
& DATA 403 Data Science Projects Laboratory 3
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. 4,5

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 I
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
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ECON 408</td>
<td>Mathematical Economics</td>
</tr>
<tr>
<td>ECON 409</td>
<td>Probability Models for Economic Decisions</td>
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</tbody>
</table>

**Total units**: 56

1. Only students in the Applied Mathematics concentration who are pursuing a Data Science minor should select Track B.
2. Students who select Track B should select Approved Electives from the Statistics Category that will fulfill prerequisites for courses in the Data Science minor.
3. DATA 401 and DATA 403 must be taken concurrently with DATA 402.
4. 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.
5. 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.