BS in Applied Mathematics

59-63 units

Students in the applied mathematics major (https://www.apu.edu/clas/programs/applied-math-major/) learn to solve problems from a variety of disciplines by developing mathematical models, applying computational algorithms, and analyzing results. The applied mathematics major allows students to choose either the standard track or one of four concentrations:

- Actuarial Science Concentration
- Computer Science Concentration
- Physics Concentration
- Statistics and Data Science Concentration

Students majoring in applied mathematics are encouraged to consider a minor in statistics. For qualified students, an advising pathway is available to pursue a BS in Applied Mathematics with computer science concentration and an MS in Applied Statistics and Data Science in a total of 5 years. Ask your academic advisor for details.

Career Opportunities

This major prepares students to be quantitative experts in a variety of fields: actuarial science, computer science, physics, university teaching, mathematical research (for business, government, or the academy), cryptography, finance and economics, statistics and data analysis, or operations research and management consulting. APU mathematics graduates have advanced to prestigious graduate schools and have moved into attractive industry positions.

Students preparing to teach mathematics at the secondary level or to pursue graduate studies in pure mathematics are encouraged to consider the mathematics major instead of the applied mathematics major.

Requirements

Code	Title	Units
MATH 165	Calculus I	3
MATH 166	Calculus II	3
MATH 167	Sequences and Series [F]	1
MATH 250	Data Analysis [F]	3
MATH 268	Multivariable Calculus	3
MATH 270	Ordinary Differential Equations [S]	4
MATH 295	Applied Linear Algebra [F]	3
MATH 361	Introduction to Modeling with Probability	3
MATH 455	Numerical Analysis [ES]	3
MATH 480	Writing 3: Mathematical Reading, Writing, and Presentation [1, F]	3
MATH 496	Mathematics Senior Seminar [2, S]	3
CS 120	Introduction to Computer Science I [3]	4
Choose the standard track or one of the concentrations below		**23-27**
Total Units		**59-63**

Standard Applied Mathematics Track

Code	Title	Units
Standard Applied Mathematics Track Requirements		
MATH 269	Vector Calculus [OF]	2
MATH 370	Partial Differential Equations [OS]	3
MATH 375	Dynamical Systems [OF]	3
MATH 470	Complex Analysis [ES]	3
PHYC 161	Physics for Science and Engineering I [4, F]	5
CS 125	Introduction to Computer Science II	4
Select at least 3 units from the following:		3-5
MATH 362	Mathematical Statistics [EF]	

MATH 495	Advanced Topics in Mathematics	
PHYC 162	Physics for Science and Engineering II [S]	
PHYC 431	Computational Methods for Physics [EF]	
Total Units		**23-25**

Actuarial Science Concentration

Code	Title	Units
Actuarial Science Concentration Requirements		
MATH 362	Mathematical Statistics [EF]	3
ACCT 120	Principles of Accounting I	3
ACCT 121	Principles of Accounting II	3
ECON 200	Survey of Economics [5]	3
FIN 300	Business Finance for Managers	3
FIN 330	Financial Analysis [F]	3
FIN 432	Investment Analysis [S]	3
FIN 436	Financial Risk Management [F]	3
Total Units		**24**

Computer Science Concentration

Code	Title	Units
Computer Science Concentration Requirements		
MATH 269	Vector Calculus [OF]	2
CS 125	Introduction to Computer Science II	4
CS 160	Discrete Structures	3
CS 260	Algorithms and Data Structures	3
PHYC 161	Physics for Science and Engineering I [4, F]	5
Select 6 units from the following:		6
MATH 495	Advanced Topics in Mathematics	
CS 290	Database Management Systems [6]	
CS 360	Computer Architecture and Organization	
CS 430	Artificial Intelligence	
CS 432	Machine Learning	
CS 435	Advanced Database Application Programming	
Total Units		**23**

Physics Concentration

Code	Title	Units
Physics Concentration Requirements		
MATH 269	Vector Calculus [OF]	2
MATH 370	Partial Differential Equations [OS]	3
PHYC 161	Physics for Science and Engineering I [4, F]	5
PHYC 162	Physics for Science and Engineering II [S]	5
PHYC 263	Physics for Science and Engineering III [F]	5
PHYC 380	Classical Mechanics [OF]	4
Select 3 units from the following:		3
MATH 375	Dynamical Systems [OF]	
MATH 470	Complex Analysis	
MATH 495	Advanced Topics in Mathematics	
PHYC 361	Electricity and Magnetism [ES]	
PHYC 401	Thermodynamics [ES]	

Code	Title	Units
PHYC 431	Computational Methods for Physics [EF]	
Total Units		**27**

Statistics and Data Science Concentration

Code	Title	Units
Statistics and Data Science Concentration Requirements		
MATH 350	Statistical Models [ES]	3
MATH 362	Mathematical Statistics	3
MATH 492	Ethics in Data Analytics [S]	2
CS 125	Introduction to Computer Science II	4
Select one of:		3
MATH 280	Discrete Mathematics and Proof [F]	
CS 160	Discrete Structures	
Select 9 units from the following:		9
CS 260	Algorithms and Data Structures	
CS 432	Machine Learning	
ECON 452	Econometrics [EF]	
ENGR 310	Discrete Systems Modeling and Simulation	
MATH 450	Real Analysis [EF]	
MATH 451	Data Visualization [F]	
MATH 495	Advanced Topics in Mathematics	
STAT 511	Applied Regression Analysis [S]	
STAT 512	Analysis of Variance and Design of Experiments	
STAT 553	Data Mining [S]	
Total Units		**24**

[1] Meets the General Education Writing 3 requirement.
[2] Meets the General Education Integrative and Applied Learning requirement.
[3] Meets the General Education Oral Communication requirement if taken with CS 290 and CS 480, or ENGR 240 and ENGR 480.
[4] Meets the General Education Natural Sciences requirement.
[5] Meets the General Education Social Sciences requirement.
[6] Meets the General Education Oral Communication requirement if taken with CS 120 and CS 480.

F	Offered in Fall only
S	Offered in Spring only
F/S	Offered in both Fall and Spring terms
EF	Offered in Fall in even years
ES	Offered in Spring in even years
OF	Offered in Fall in odd years
OS	Offered in Spring in odd years

Program Learning Outcomes

Program Learning Outcomes

Students who successfully complete this program shall be able to:

1. Master fundamental mathematical methods and problem solving strategies.

2. Communicate mathematical ideas in speech and writing, combining precise language and notation with insightful explanation.

3. Use mathematical models to analyze cross-disciplinary problems.

4. Employ appropriate technology and computational techniques.

5. Articulate how Christian perspectives and the study of mathematics and its applications mutually inform and enhance each other.