

MATHEMATICS: MATHEMATICS FOR ECONOMICS AND FINANCE

The Mathematics major's named options allow students to develop a deep understanding of how the subject relates to other areas of human inquiry. The requirements for these options feature mathematics courses with topics inspired by and commonly applied to problems in these associated fields. Though often paired with a second major in a related area, these programs function well alone and are suited to any mathematics student with a variety of interests. Students interested in a named option are recommended to meet with an advisor to navigate the various plans and courses available to them. Advising information can be found on the BA or BS pages (<https://guide.wisc.edu/undergraduate/letters-science/mathematics/mathematics-ba/#advisingandcareerstext>).

The named options do not support Honors in the Major.

REQUIREMENTS

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The Mathematics Major with Economics and Finance focus requires 10 distinct courses for at least 30 credits as described below. Note that while some courses may be used to fulfill more than one requirement it is still considered only a single course and may only contribute once to the total course count. Finally, at most one course from each of the following groupings may be used to fulfill the minimum course and credit requirement (i.e.: minimum of ten courses and at least 30 credits): Intro Linear Algebra (MATH 320, MATH 340, MATH 341, MATH 375), Intro Differential Equations (MATH 319, MATH 320 or MATH 376), and Intro Probability (MATH/STAT 309 or MATH/STAT 431).

Code	Title	Credits
Core Math Requirement (minimum of six distinct MATH courses for at least 18 credits) ¹		
<i>Linear Algebra</i>		3-5
MATH 341	Linear Algebra	
or MATH 320	Linear Algebra and Differential Equations	
or MATH 340	Elementary Matrix and Linear Algebra	
or MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	
<i>Differential equations</i>		0-5
MATH 319	Techniques in Ordinary Differential Equations	
or MATH 320	Linear Algebra and Differential Equations	
or MATH 322	Applied Mathematical Analysis 2: Partial Differential Equations	
or MATH 376	Topics in Multi-Variable Calculus and Differential Equations	
or MATH 415	Applied Dynamical Systems, Chaos and Modeling	
or MATH 519	Ordinary Differential Equations	

<i>Intermediate Mathematics Requirement (complete at least one)</i>		0-6
MATH 341	Linear Algebra	
or MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	
MATH 421	The Theory of Single Variable Calculus	
MATH 321 & MATH 322	Applied Mathematical Analysis 1: Vector and Complex Calculus and Applied Mathematical Analysis 2: Partial Differential Equations	
<i>Analysis Requirement</i>		3
MATH 521	Analysis I	
Electives to reach required six courses for at least 18 credits of MATH		
<i>At least one course must be selected from:</i>		
MATH/COMP SCI 513	Numerical Linear Algebra	
MATH/COMP SCI 514	Numerical Analysis	
MATH 519	Ordinary Differential Equations	
MATH 522	Analysis II	
MATH/COMP SCI/I SY E/STAT 525	Linear Optimization	
MATH 531	Probability Theory	
MATH 535	Mathematical Methods in Data Science	
MATH 540	Linear Algebra II	
MATH 616	Data-Driven Dynamical Systems, Stochastic Modeling and Prediction	
MATH 619	Analysis of Partial Differential Equations	
MATH 627	Introduction to Fourier Analysis	
MATH 629	Introduction to Measure and Integration	
MATH/I SY E/OTM/STAT 632	Introduction to Stochastic Processes	
MATH 635	An Introduction to Brownian Motion and Stochastic Calculus	
<i>Remaining courses/credits may be from:</i>		
MATH/STAT 310	Introduction to Probability and Mathematical Statistics II	
MATH 321	Applied Mathematical Analysis 1: Vector and Complex Calculus	
MATH 322	Applied Mathematical Analysis 2: Partial Differential Equations	
MATH 415	Applied Dynamical Systems, Chaos and Modeling	
MATH 421	The Theory of Single Variable Calculus	
MATH/COMP SCI/I SY E 425	Introduction to Combinatorial Optimization	
MATH/STAT 431	Introduction to the Theory of Probability	

or MATH/ STAT 309	Introduction to Probability and Mathematical Statistics I
MATH 443	Applied Linear Algebra
MATH 444	Graphs and Networks in Data Science
MATH/ COMP SCI/ STAT 475	Introduction to Combinatorics
Economics/Finance Requirement (Four Courses distinct from the above for at least 12 credits) ¹	
<i>Select one of the following introductory sequences:</i> 6-8	
ECON 311 & ECON 312	Intermediate Microeconomic Theory - Advanced Treatment and Intermediate Macroeconomic Theory - Advanced Treatment
ECON 301 & ECON 302	Intermediate Microeconomic Theory and Intermediate Macroeconomic Theory
ECON/ FINANCE 300 & ECON/ FINANCE 320	Introduction to Finance and Investment Theory
<i>Economics/Finance Elective (choose at least two) ²</i> 6-8	
ECON 400	Introduction to Applied Econometrics
ECON 410	Introductory Econometrics
ECON/A A E 421	Economic Decision Analysis
ECON 435	The Financial System
ECON 441	Analytical Public Finance
ECON 442	Macroeconomic Policy
ECON 448	Human Resources and Economic Growth
ECON 450	Wages and the Labor Market
ECON 455	Behavioral Economics
ECON 458	Industrial Structure and Competitive Strategy
ECON 460	Economic Forecasting
ECON 461	International Macroeconomics
ECON 464	International Trade
ECON 468	Industrial Organization and Imperfect Competition
ECON 475	Economics of Growth
ECON/ FINANCE 503	Markets with Frictions
ECON 521	Game Theory and Economic Analysis
ECON/A A E 526	Quantitative Methods in Agricultural and Applied Economics
ECON 621	Markets and Models
ECON 661	Issues in International Macroeconomics
ECON 664	Issues in International Trade
ECON 666	Issues in International Finance
FINANCE 305	Financial Markets, Institutions and Economic Activity

FINANCE 325	Corporation Finance
FINANCE 330	Derivative Securities
FINANCE 340	Fixed Income Securities
FINANCE/ INTL BUS 445	Multinational Business Finance

Total Credits **30**

RESIDENCE AND QUALITY OF WORK

- 2.000 GPA on all MATH courses and courses eligible for the major.³
- 2.000 GPA on at least 15 credits of upper level credit in the major.⁴
- 15 credits in MATH in the major taken on the UW-Madison campus.⁵

FOOTNOTES

- ¹ Some courses which follow may have prerequisites outside of the courses approved for this named option.
- ² Any MATH course from the elective list above may be used in lieu of any of the following courses.
- ³ This includes any MATH courses (and those cross-listed with MATH) regardless of appearing in the tables above as well as only those non-MATH courses which are explicitly listed in the tables above.
- ⁴ This includes any MATH courses (and those cross-listed with MATH) numbered 307 and above, regardless of appearing in the tables above, as well as only those non-MATH course explicitly listed in the tables above which carry the advanced LAS designation.
- ⁵ This includes any MATH courses (and courses cross-listed with MATH) numbered 307 and above regardless of appearing in the tables above.

FOUR-YEAR PLAN

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This Four-Year Plan is only one way a student may complete an L&S degree with this major. Many factors can affect student degree planning, including placement scores, credit for transferred courses, credits earned by examination, and individual scholarly interests. In addition, many students have commitments (e.g., athletics, honors, research, student organizations, study abroad, work and volunteer experiences) that necessitate they adjust their plans accordingly. Informed students engage in their own unique Wisconsin Experience by consulting their academic advisors, Guide, DARS, and Course Search & Enroll for assistance making and adjusting their plan.

In general, your four year plan in mathematics should be organized along the following sequence:

1. Calculus
2. Linear Algebra
3. Required Intermediate MATH course
4. Additional 300/400-level courses as needed
5. Required Advanced MATH course
6. Additional 500/600-level courses

Freshman

Fall	Credits Spring	Credits
MATH 221	5 MATH 222	4
Literature Breadth	3 ECON 101	4
Communication A	3 Ethnic Studies	3
Foreign Language (if required)	4 Foreign Language (if required)	4
	15	15

Sophomore

Fall	Credits Spring	Credits
MATH 234 ¹	4 MATH Linear Algebra	3
Humanities Breadth	3 300/400-level MATH Elective ³	3
Communication B	3 Humanities Breadth	3
Physical Science Breadth	3 Physical Science Breadth	3
Elective ²	3 Elective	3
	16	15

Junior

Fall	Credits Spring	Credits
MATH Differential Equations	3 Required Intermediate MATH Course	3
Economics/Finance intro course 1	3-4 Economics/Finance intro course 2	3-4
Biological Sciences Breadth	3 Biological Sciences Breadth	3
Literature Breadth	3 Physical Science Breadth	3
Elective	3 Elective	3
	15	15

Senior

Fall	Credits Spring	Credits
MATH 521	3 500/600-level MATH Elective	3
Econ/Finance Elective	3-4 Econ/Finance elective	3-4
Social Science Breadth	3 Social Science Breadth	3
Elective	3 Elective	3
Elective	3 Elective	2
	15	14

Total Credits 120

Students must declare a major by the time they reach Senior standing (86 credits).

Please refer to the Requirements tab in Guide for additional College of Letters & Science Breadth and Degree Requirements as well as Residence and Quality of Work requirements for the major.

¹ Students should declare the math major upon successful completion of this course

² Students may use this elective to take the second prerequisite for their introductory economics/finance sequence: ECON 102, ACCT I S 100, or ACCT I S 300.

³ MATH/STAT 431 or STAT/MATH 309 is recommended since it can be used as the prerequisite for a number of the Economics and Finance courses students can choose in this named option.