

MATHEMATICAL ECONOMICS, BACHELOR OF SCIENCE (731)

Program Coordinator

Melanie A. Autin, melanie.autin@wku.edu, (270) 745-6171

Alex Lebedinsky, alex.lebedinsky@wku.edu, (270) 745-3150

The BS in Mathematical Economics is for students wishing to pursue either a graduate degree in economics or a highly applied, analytical occupation with a heavy emphasis on quantitative skills such as an actuary. This degree does not require a second major or a minor. The BS in Mathematical Economics offers two concentrations: General concentration and Actuarial Science concentration.

International students who complete this program may qualify for the STEM OPT extension (the CIP Code of the program is 45.0603).

The General concentration in the BS in Mathematical Economics requires a minimum of 50 hours. This major is strongly recommended for students considering either a PhD in Economics or highly applied, analytical occupations, especially in data analytics. Because doctoral programs in economics are highly mathematical, this degree combines the economics coursework with the mathematics courses that are necessary to succeed in an economics doctoral program.

The Actuarial Science concentration in the BS in Mathematical Economics requires a minimum of 64 hours. This degree is strongly recommended for students pursuing careers as actuaries. Actuaries are professionals who specialize in modeling and managing risks. Actuaries typically work for health, life, and property insurance companies, but individuals with actuarial training may work in many other areas such as banking, investment, energy, government, employee benefits, predictive analytics, and many more. Actuaries use a combination of strong analytical skills, business knowledge, and an understanding of human behavior. It takes five to seven years on average to become an actuary after completing an undergraduate degree. To become an actuary, one must pass a series of exams to earn an actuarial designation by either the Casualty Actuarial Society (CAS) or the Society of Actuaries (SOA). Students in the Actuarial Science concentration will take courses that will help them prepare for the first two actuarial exams. As a part of becoming an actuary, candidates must also earn Validation by Educational Experience (VEE) credits, which demonstrate that as students they received academic training in certain required areas. The course work in this concentration is designed for students to receive all three of the VEE credits required by the SOA: Economics, Mathematical Statistics, and Accounting and Finance.

Concentrations

- General Mathematical Economics (MEGM)
- Actuarial Science (MEAS)

Program Requirements (50-65 hours)

A baccalaureate degree requires a minimum of 120 unduplicated semester hours. More information can be found at www.wku.edu/registrar/degree_certification.php. (https://www.wku.edu/registrar/degree_certification.php)

Students who began WKU in the Fall 2014 and thereafter should review the Colonnade requirements located at: <https://www.wku.edu/>

[colonnade/colonnaderequirements.php](http://colonnade.colonnaderequirements.php). (<https://www.wku.edu/colonnade/colonnaderequirements.php>)

The major in Mathematical Economics requires a total of 120 credit hours with a core of 18 hours in economics, 15 hours in mathematics, and 1 hour of an interdisciplinary seminar course. The concentration in general mathematical economics requires an additional 9 hours in economics, 6 hours in mathematics, and 1 hour in a career readiness course. The concentration in actuarial science requires an additional 3 hours in economics, 9 hours in mathematics, 12 hours in finance, 3-4 hours in computer science, and 3 hours in actuarial science.

The program of study does not require completion of a second major or minor.

Code	Title	Hours
Core Courses		
ECON 202	Principles of Economics (Micro)	3
ECON 203	Principles of Economics (Macro)	3
ECON 206	Statistics	3
or STAT 301	Introductory Probability and Applied Statistics	
ECON 302	Microeconomic Theory	3
ECON 303	Macroeconomic Theory	3
Select one of the following:		3
ECON 465	Regression and Econometric Analysis	
ECON 480	Economic Forecasting	
STAT 401	Regression Analysis	
MATH 136	Calculus I	4
MATH 137	Calculus II	4
MATH 237	Multivariable Calculus	4
MATH 306	Applied and Computational Linear Algebra ¹	3
or MATH 307	Introduction to Linear Algebra	
ECON 497	Senior Seminar in Mathematical Economics	1
Total Hours		34

¹ Students who plan to pursue a PhD in Economics should take MATH 307.

Additionally, majors must choose a concentration in either General Mathematical Economics or Actuarial Science.

General Mathematical Economics Concentration

Code	Title	Hours
ECON 306	Statistical Analysis	3
or ECON 307	Financial Data Modeling	
ECON 464	Introduction to Mathematical Economics	3
Select 3 hours of 300- and 400-level economics electives		3
MATH 331	Differential Equations	3
or MATH 310	Introduction to Discrete Mathematics	
Select one of the following:		3
MATH 331	Differential Equations	
MATH 310	Introduction to Discrete Mathematics	

MATH 305	Introduction to Mathematical Modeling	
MATH 382	Probability and Statistics I	
MATH 435	Partial Differential Equations	
MATH 405	Numerical Analysis I	
ECON 399	Career Readiness in Economics	1
Total Hours		16

Actuarial Science Concentration

Code	Title	Hours
ECON 307	Financial Data Modeling	3
MATH 310	Introduction to Discrete Mathematics	3
ACTU 382	Probability and Statistics I	3
ACTU 482	Probability and Statistics II	3
FIN 330	Principles of Finance	3
FIN 332	Investment Theory	3
FIN 350	Risk Management and Insurance	3
FIN 437	Corporate Asset Management	3
CS 170	Problem Solving and Programming	3-4
or CS 180	Computer Science I	
or STAT 330	Introduction to Statistical Software	
ACTU 301	Financial Mathematics for Actuarial Science	3
Total Hours		30-31

Finish in Four Plan

Actuarial Science Concentration

First Year			
Fall	Hours	Spring	Hours
BA 170		1 COMM 145	3
ENG 100		3 MATH 137	4
MATH 136		4 ECON 202	3
Colonnade - Arts & Humanities		3 HIST 101 or HIST 102	3
General University Elective		3 Colonnade - Natural & Physical Sciences w/ lab	3
		14	16
Second Year			
Fall	Hours	Spring	Hours
ECON 203		3 CS 170, CS 180, or STAT 330 (STAT 330 is recommended.)	3-4
ACCT 110 (Pre-requisite for FIN 330)		3 FIN 330	3
MATH 306 or MATH 307 ¹		3 ECON 206 or STAT 301	3
MATH 310		3 MATH 237	4
Colonnade - Literary Studies		3 Colonnade - Natural & Physical Sciences	3
		15	16-17
Third Year			
Fall	Hours	Spring	Hours
ECON 302		3 ECON 303	3
ECON 307		3 FIN 332	3
ACTU 382		3 FIN 350	3
ACTU 301		3 ACTU 482	3

Colonnade - Connections Social & Cultural or Local to Global or Systems	3	Colonnade - Writing in the Disciplines	3
		15	15
Fourth Year			
Fall	Hours	Spring	Hours
ECON 465, STAT 401, or ECON 480 ²		3 ECON 497	1
FIN 437		3 Colonnade - Connections Social & Cultural or Local to Global or Systems	3
FIN 438 ³		3 General University Elective	3
Colonnade - Connections Social & Cultural or Local to Global or Systems		3 General University Elective	3
General University Elective		3 General University Upper-Division Elective	3
		General University Elective	1
		15	14

Total Hours 120-121

- ¹ Students who plan to pursue a PhD in Economics should take MATH 307.
- ² It is recommended that ECON 465 should be taken during the second to last semester as it will help student prepare for the Senior Seminar. ECON 465 should not be taken concurrently with ECON 497
- ³ ECON 480 and FIN 438 are not required for the degree. However, FIN 438 can be used toward a VEE credit, and ECON 480 will help students prepare for actuarial exams.

General Concentration

First Year			
Fall	Hours	Spring	Hours
BA 175		3 COMM 145	3
ECON 202		3 HIST 101 or HIST 102	3
ENG 100		3 MATH 137	4
MATH 136		4 Colonnade - Arts & Humanities	3
Colonnade - Natural Sciences w/ lab		3 Colonnade - Literary Studies	3
		16	16
Second Year			
Fall	Hours	Spring	Hours
MATH 306 or MATH 307 ¹		3 CS 170 or CS 180	3-4
ECON 203		3 ECON 206 or STAT 301	3
MATH 310 or MATH 331		3 MATH 237	4
Colonnade - Natural & Physical Sciences w/ no lab		3 Colonnade - Social & Cultural or Local to Global or Systems	3
Colonnade - Connections Social & Cultural or Local to Global or Systems		3 General Elective	3
		15	16-17
Third Year			
Fall	Hours	Spring	Hours
ECON 302		3 ECON 303	3

ECON 306	3	ECON 465, ECON 480, or STAT 401	3
General upper-division Elective	3	Colonnade - Writing in the Disciplines	3
General Elective	3	Colonnade - Connections Social & Cultural or Local to Global or Systems	3
MATH 305, MATH 310, or MATH 331	3	General Elective	3
		15	15
Fourth Year			
Fall	Hours	Spring	Hours
ECON 464		3 ECON 497	1
ECON 465 ²		3 General upper-division Elective	3
General upper-division Elective		3 General upper-division Elective	3
General upper-division Elective		3 General Elective	3
General Elective		3 General Elective	2
		15	12
Total Hours 120-121			

¹ Students who plan to pursue a PhD in Economics should take MATH 307.

² It is recommended that ECON 465 should be taken during the second to last semester as it will help student prepare for the Senior Seminar. ECON 465 should not be taken concurrently with ECON 497.