ECONOMICS BA/ MATHEMATICS, BS - DUAL DEGREE

Introduction

Please click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/economics/) to see Economics department information or here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/mathematical-statistical-sciences/) for Mathematical and Statistical Sciences department information.

A solid training in the mathematical and statistical sciences is fundamental to optimally prepare economics students for graduate school. A dual degree in economics and mathematics will substantially increase program quality and career prospects for our students, as well as enhance the reputation of the economics program at CU Denver. Similarly, a solid training in quantitative and qualitative economic principles offers significant benefits to mathematics majors who seek industrial and/or consulting positions.

These degree requirements are subject to periodic revision by the academic department, and the College of Liberal Arts and Sciences reserves the right to make exceptions and substitutions as judged necessary in individual cases. Therefore, the College strongly urges students to consult regularly with their Economics major advisor, Math major advisor and CLAS advisor to confirm the best plans of study before finalizing them.

Economics Advisors:

- Debbie Evercloud debbie.evercloud@ucdenver.edu
- Jim Smith jim.smith@ucdenver.edu

Mathematics Advisor:

- Adam Spiegler math.advising@ucdenver.edu

Program Delivery

- This is an on-campus program.

Declaring This Major

- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/#policiestext) to go to information about declaring a major.

General Requirements

To earn a degree, students must satisfy all requirements in each of the three areas below, in addition to their individual major requirements.

- CU Denver General Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation/)
- CU Denver Core Curriculum (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/)
- College of Liberal Arts & Sciences Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/#graduationrequirementstext)
- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/) for information about Academic Policies

Program Requirements

1. Students must complete a minimum of *72* hours with a minimum of 30 ECON credit hours and a minimum of 39 MATH credit hours.
2. Students must complete a minimum of 27 upper division (3000-level and above) ECON credit hours and a minimum of 27 upper division (3000-level and above) MATH credit hours.
3. Students must earn a minimum grade of C- (1.7) in all courses that apply to the majors and must achieve a minimum cumulative GPA of 2.0 in ECON courses and a cumulative GPA of 2.25 in MATH courses. All graded attempts in required and elective courses are calculated in the major GPA. Courses taken using P+/P/F or S/U grading cannot apply to major requirements.
4. Students must complete a minimum of 18 ECON credit hours including ECON 4811 Introduction to Econometrics, with CU Denver faculty. Once a student has enrolled at CU Denver, no more courses in the major can be taken outside the CU Denver Economics Department. This includes courses offered at Metropolitan State University. The department reserves the right to require a demonstration of competence for any core courses not taken from CU Denver faculty. Additionally, the Department of Mathematical and Statistical Sciences requires that at least 15 upper-division Mathematics credits must be taken at CU Denver.

Program Restrictions, Allowances and Recommendations

1. In addition to the CLAS residence requirements, the Economics Department requires that all courses other than ECON 2012 Principles of Economics: Macroeconomics and ECON 2022 Principles of Economics: Microeconomics require written department approval to be transferred in as satisfying major requirements.
2. A student who attempts the dual degree but who does not fulfill all requirements for the Mathematics BS will need to complete the requirements for the Economics BA as a stand-alone degree. A Mathematics elective will substitute for one of the six economics electives only if all requirements of the Mathematics major are met.

Code	Title	Hours
Complete one of the following programming requirements:		*3*
MATH 1376	Programming for Data Science	
CSCI 1410 & CSCI 1411	Fundamentals of Computing and Fundamentals of Computing Laboratory	
Complete all of the following Economics courses:		*15*
ECON 2012	Principles of Economics: Macroeconomics	
ECON 2022	Principles of Economics: Microeconomics	
ECON 4071	Intermediate Microeconomic Theory	
ECON 4081	Intermediate Macroeconomic Theory	
ECON 4811	Introduction to Econometrics	
Complete all of the following Mathematics courses:		*30*
MATH 1401	Calculus I	
MATH 2411	Calculus II	
MATH 2421	Calculus III	

MATH 3000	Introduction to Abstract Mathematics	
MATH 3191	Applied Linear Algebra	
MATH 3200	Elementary Differential Equations	
MATH 3382	Statistical Theory	
MATH 4310	Introduction to Real Analysis I	
MATH 4779	Math Clinic	
Complete a minimum of 15 elective credit hours in ECON (p. 2)		15
Complete a minimum of 9 elective credit hours in MATH (p. 2)		9
Total Hours		**72**

Economics Electives

Code	Title	Hours
Complete six upper division level Economics elective courses or five Economics elective courses plus one Mathematics elective course from the list below.		15
A minimum of four of these courses must be at the 4000-level.		
ECON 3801 Introduction to Mathematical Economics and ECON 3811 Statistics with Computer Applications cannot be counted as electives.		
One of the following approved Mathematics electives can be double counted as the sixth Economics elective.		
ECON 3050	Decision Making	
ECON 3100	Economics of Race and Gender	
ECON 3300	Economics of Crime and Punishment	
ECON 3366	Managerial Economics	
ECON 3400	Economics of Sex and Drugs	
ECON 3415	Issues in International Trade and Finance	
ECON 3770	Issues in Economic Development	
ECON 4001	Topics in Economics	
ECON 4030	Data Analysis with SAS	
ECON 4050	Special Economic Problems	
ECON 4090	History of Economic Thought	
ECON 4110	Money and Banking	
ECON 4150	Economic Forecasting	
ECON 4210	Public Finance	
ECON 4240	Economic Policy Analysis	
ECON 4310	Managerial Economics	
ECON 4318	Urban Economics	
ECON 4320	Financial Economics	
ECON 4410	International Trade	
ECON 4420	International Finance	
ECON 4430	Economic Growth	
ECON 4461	Economic Incentives	
ECON 4530	Economics of Natural Resources	
ECON 4540	Environmental Economics	
ECON 4550	Game Theory and Economic Applications	
ECON 4610	Labor Economics	
ECON 4640	Sports Economics	
ECON 4660	Health Economics.	
ECON 4670	Economics of Population and Growth	
ECON 4740	Industrial Organization	
ECON 4770	Development Economics	
ECON 4812	Advanced Econometric Methods	
MATH 3301	Introduction to Optimization	
MATH 3302	Simulation in Operations Research	
MATH 3810	Introduction to Probability	
MATH 4390	Game Theory	
MATH 4387	Applied Regression Analysis	
MATH 4650	Numerical Analysis I	
MATH 4733	Partial Differential Equations	

Mathematics Electives

Code	Title	Hours
Complete four upper-division level Mathematics elective courses or three Mathematics elective course plus one Economics elective course from the list of approved Economics electives below.		9
Excluding MATH 3041 Fundamental Math: Algebra, Probability and Data Analysis, MATH 3195 Linear Algebra and Differential Equations, MATH 3511 Mathematics of Chemistry, MATH 3800 Probability and Statistics for Engineers, and MATH 4830 Applied Statistics.		
One of the following approved Economics electives at the end of the list can be double counted as the fourth Mathematics elective.		
MATH 3301	Introduction to Optimization	
MATH 3302	Simulation in Operations Research	
MATH 3376	Data Wrangling & Visualization	
MATH 3440	Introduction to Symbolic Logic	
MATH 3810	Introduction to Probability	
MATH 4010	History of Mathematics	
MATH 4027	Topics in Mathematics	
MATH 4110	Theory of Numbers	
MATH 4140	Introduction to Modern Algebra	
MATH 4320	Introduction to Real Analysis II	
MATH 4337	Intro to Statistical and Machine Learning	
MATH 4387	Applied Regression Analysis	
MATH 4388	Machine Learning Methods	
MATH 4390	Game Theory	
MATH 4394	Experimental Designs	
MATH 4408	Applied Graph Theory	
MATH 4409	Applied Combinatorics	
MATH 4450	Complex Variables	
MATH 4650	Numerical Analysis I	
MATH 4660	Numerical Analysis II	
MATH 4733	Partial Differential Equations	
MATH 4791	Continuous Modeling	
MATH 4792	Probabilistic Modeling	
MATH 4793	Discrete Math Modeling	
MATH 4794	Optimization Modeling	
ECON 4030	Data Analysis with SAS	
ECON 4110	Money and Banking	
ECON 4150	Economic Forecasting	
ECON 4320	Financial Economics	
ECON 4430	Economic Growth	
ECON 4550	Game Theory and Economic Applications	
ECON 4610	Labor Economics	
ECON 4740	Industrial Organization	
ECON 4812	Advanced Econometric Methods	

To learn more about the Economics BA Student Learning Outcomes for this program, please visit our website (https://clas.ucdenver.edu/economics/programs/bachelor-arts/).

To learn more about the Mathematics BS Student Learning Outcomes for this program, please visit our website (https://clas.ucdenver.edu/mathematical-and-statistical-sciences/undergraduate-goals-and-objectives/).

To review the Degree Map for this program, please visit our website (https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/clas/).