

REQUIREMENTS FOR THE BA ECONOMICS MAJOR WITH **QUANTITATIVE EMPHASIS**

UNIVERSITY OF COLORADO BOULDER

The Economics Major with Quantitative Emphasis is designed for well-qualified economics majors having an interest in courses with quantitative content both within the Economics Department and in other departments. This program is recommended for Economics majors who are considering careers or graduate programs in theoretical and applied economics. Students planning to pursue graduate studies in economics are urged to follow the theoretical track (II.B.1 below), while those interested in applied quantitative research should pursue the applied track (II.B.2). Students completing the program will receive a certificate from the Economics Department upon graduation.

The Quantitative Emphasis may be added to the Economics major track after the student has completed at least two of the following intermediate-level courses (ECON 3070, 3080 and/or 3818), and attains at least a 3.0 GPA in the economics major and for two of the three stated courses. Students interested in adding this emphasis should contact their Economics advisor once they are in compliance with these conditions. All Economics and ancillary courses applied to the emphasis must be completed with grades of C- or better. A student's major GPA must be at or above 3.000 at the time of graduation for the emphasis certificate to be awarded.

Students must complete **at least 32 hours of Economics courses** plus **19-20 hours of mathematics-related ancillary course work** from outside the Economics Department. ECON 1078 and 1088 do not count toward the minimum economics credit requirement but do count in the Econ major GPA calculation. With presentation of a course syllabus, the Undergraduate Studies Director will consider topically relevant courses on a case-by-case basis for fulfillment of the required ancillary course work in substitution for those listed below. Please contact your Economics advisor for further assistance. Transfer students must complete at least 6 hours of this ancillary course work at the University of Colorado at Boulder.

I. **REQUIRED ECONOMICS COURSES**

A. Lower Division – Econ. Requirements

ECON 2010 Principles of Microeconomics and ECON 2020 Principles of Macroeconomics (8 hrs.)

Lower Division - Math Requirements⁺⁺

- Choose one
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| Option 1 | ECON 1078 <u>Math Tools for Economists 1</u> and ECON 1088 <u>Math Tools for Economists 2</u> (6 hrs.) OR |
| Option 2 | MATH 1071 <u>Finite Mathematics</u> and MATH 1081 <u>Calculus for Social Sciences/Business</u> (6 hrs.) OR |
| Option 3 | MATH 1150 <u>Precalculus Mathematics</u> and MATH 1300 <u>Analytic Geometry and Calculus 1</u> (9 hrs.) OR |
| Option 4 | Eight hours of mathematics at or above the level of MATH 1300 (QRMS 2380 is not applicable) |

⁺⁺Quantitative Emphasis students are required to complete MATH 1300 and MATH 2300 or equivalents, plus 9-10 credit hours of additional mathematics courses. See REQUIRED MATHEMATICS COURSES below.

B. Upper Division Requirements

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| Take all | ECON 3070 | <u>Intermediate Microeconomic Theory</u> (3 hrs.) |
| | ECON 3080 | <u>Intermediate Macroeconomic Theory</u> (3 hrs.) |
| | ECON 3818* | <u>Intro. to Economics Statistics with Computer Applications</u> (4 hrs.) |
| Choice of: | ECON 4818 | <u>Intro. to Econometrics</u> (3 hrs.) OR ECON 4848 <u>Applied Econometrics</u> (3 hrs.) |

*APPM 4520, APPM 4570, CHEN 3010, CVEN 3227, MATH 4520, SOCY 4061 are approved substitutes for ECON 3818. Students are not required to complete a replacement economics course when applying an approved substitute statistics course.

C. Quantitative Courses in Economics (6 hrs.) Choose two

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| ECON 4070 <u>Topics in Microeconomics</u> (3 hrs.) | ECON 4838 <u>Microcomputer Applications in Economics</u> (3hrs.) |
| ECON 4808 <u>Intro. to Mathematical Economics</u> (3 hrs.) | ECON 4848* <u>Applied Econometrics</u> (3hrs.) |
| ECON 4818 * <u>Intro. to Econometrics</u> (3 hrs.) | ECON 4858 <u>Financial Econometrics</u> (3hrs.) |

*Students *must complete* either ECON 4818 or 4848 to satisfy the Econometrics requirement. However, students may apply the second Econometrics course specified in Step B to satisfy a Step C quantitative course requirement.

D. Elective Courses in Economics

- 6 credit hours of 4000-level economics electives (9 hours if transferring six credits of micro and macro Principles courses).
- 3 credit hours must be non-quantitative in nature.

II. REQUIRED MATHEMATICS COURSES

Note: Many of the following courses listed below have prerequisites. Students are responsible for completing prerequisites before enrolling in these courses.

A. Required Calculus Courses

Take both MATH 1300 Analytic Geometry and Calculus 1 (5 hrs.)
 MATH 2300 Analytic Geometry and Calculus 2 (5 hrs.)

Note: APPM 1350 and APPM 1360 may substitute for MATH 1300 and 2300, respectively.

B.1. Mathematics Courses for Theoretical Track

MATH 2400 Calculus 3 (4 hrs.) **AND**

Six credit hours selected from the following list of courses:

MATH 3001 Analysis 1 (3 hrs.)
 MATH 3130 Intro. to Linear Algebra (3 hrs.)
 MATH 4120 Introduction to Operations Research (3 hrs.)
 MATH 4430 Ordinary Differential Equations (3 hrs.)
 MATH 4510 Introduction to Probability Theory (3 hrs.)*
 MATH 4520 Introduction to Mathematical Statistics (3 hrs.)*+

*APPM 3570 and APPM 4520 may substitute for MATH 4510 and 4520, respectively.

B.2. Applied Mathematics Courses for Applied Track

Three courses selected from courses listed below:

APPM 2360 Introduction to Linear Algebra and Differential Equations (3 hrs.) **OR**
 MATH 2400 Calculus 3 (4 hrs.)
 MATH 4540 Introduction To Time Series (3 hrs.)
 APPM 4570 Statistical Methods (3 hrs.) +
 APPM 4120 Introduction to Operations Research (3 hrs.)
 APPM 4580 Statistical Methods for Data Analysis (3 hrs.)
 CSCI 1200 Introduction to Programming 1 (4 hrs.) **OR**
 CSCI 1300 Introduction to Computing (4 hrs.)

MATH 4520 and APPM 4570 may *not* be taken to satisfy both requirements I.C and II.B. Each course may fulfill *one* requirement.