

## **Dual Master's Degree Program in Applied Mathematics and Economics**

The Departments of Mathematics and Economics offer selected students the option of obtaining a dual M.S. degree in applied mathematics and an M.A. degree in economics within an integrated program. Whereas obtaining separate master's degrees would nominally require a minimum of 60 credit hours of course work, students enrolled in the dual master's degree program may obtain degrees based on 48 credit hours of course work. Students may be able to complete degree requirements within two and a half years.

Rationale for the dual master's degree program: The interplay between mathematics and the field of economics has become more and more intense in the past four decades. On one hand sophisticated mathematical tools have been involved in advanced research in economic theory, and on the other hand various economic phenomena have inspired many applied mathematicians. The proposed dual master degree program in mathematics and economics will help students to prepare themselves better so that they are substantially more attractive to their potential employers, as well as providing them enough background to further their academic studies if they choose to do so.

### **General Requirements**

I. In each degree field a minimum of 18 hours of graduate courses is required.

The students are required to choose from the Department of Mathematics two of the following three core courses:

Math 8440 Advanced Ordinary Differential Equations I  
Math 8445 Partial Differential Equations I  
Math 8480 Advanced Probability,

and choose 4 more elective courses from the following list:\*

Math 7140 Matrix Theory  
Math 7300 Numerical Analysis  
Math 7310 Numerical Linear Algebra  
Math 7320 Introduction to Probability Theory  
Math 7500 Applied Analysis  
Math 7520 Statistical Inference I  
Math 7700 Advanced Calculus I  
Math 7900 Advanced Calculus II  
Math 8425 Complex Analysis I  
Math 8440 Advanced Ordinary Differential Equations I  
Math 8445 Partial Differential Equations I  
Math 8480 Advanced Probability  
Math 8680 Stochastic Processes

Total: 18 credit hours

The students are required to take the following core courses from the Department of Economics:

Econ 8451 Microeconomic Theory

Econ 8453 Macroeconomic Theory

Econ 8473 Applied Econometrics

(8451 may be replaced by 9451, 8453 by 9453, and 8473 by 9473 for students who satisfy the prerequisites of these 9000 level classes.)

and 3 elective courses from the following:\*

Econ 7311 Labor Economics

Econ 7312 Labor Market Analysis

Econ 7315 Public Economics

Econ 7316 State and Local Finance

Econ 7320 History of Economic Thought

Econ 7322 Economics of Regulation and Antitrust

Econ 7325 The International Monetary System

Econ 7326 Economics of International Trade

Econ 7329 The Banking System and the Money Market

Econ 7340 Introduction to Game Theory

Econ 7355 Industrial Organization

Econ 7360 Economic Development

Econ 7367 Law and Economics

Econ 7368 Macroeconomic Forecasting

Econ 7370 Quantitative Economics

Econ 7371 Introductory Econometrics

Econ 7775 Dynamic Optimization and Its Applications to the Natural Sciences and Economics

Econ 8001 Topics in Economics

Any 9000-level course (excluding 9413, 9090 and 9480) for students who satisfy the prerequisites of these 9000-level classes

Total: 18 credit hours

\*In appropriate situations comparable courses may be substituted if approved by the advisors and Directors of Graduate Studies.

II. In addition, students are required to take the following shared 8000-level graduate courses:

Math 8190 Master's Project (3 credit hours) or Math 8090 Master's Thesis (3 credit hours)

Math 8420 Theory of Functions of Real Variables I (3 credit hours)

Econ 8413 Research Workshop (3 credit hours)

Econ 8085 Problems (3 credit hours)

Total: 12 credit hours

III. Students are required to complete an M.A. paper in economics (normally undertaken in Econ 8413) and a master's project in mathematics (Math 8190). Students are encouraged to undertake a

single project that will satisfy both requirements. It is expected that the project will contain substantial work done in each field.

Each candidate will select two co-advisors, one from mathematics and one from economics and at least one additional committee member from each department. The candidate may select separate committees, one from each department, or a joint committee consisting of two members from mathematics and two from economics.

Up to 8 hours of transfer credit may be applied as follows: to one of the two degree programs, or divided between the two degree programs. The 8 hours of transfer credits cannot be applied to each degree program separately.

Applicants to the dual degree program may be eligible for financial support for up to three years of study. Special fellowship support is available through the Department of Mathematics.

### **Application Procedure**

Students should be admitted to both degree programs in the Department of Mathematics and Economics at the same time using a separate application to each. Because some students may not be aware of the dual master's degree program prior to their arrival at MU, the option to participate in the program may be postponed to no later than the end of a student's second semester at MU.

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