PROPOSED CHANGES TO DEGREE PROGRAMS IN THE
UNDERGRADUATE CATALOG, 2010-2012
or
LAW SCHOOL CATALOG, 2010-2012

NAME OF DEGREE PROGRAM(S):
BACHELOR OF ARTS WITH A MAJOR IN ECONOMICS

EXPLAIN CHANGE(S) TO DEGREE PROGRAM:

We propose to add Econometrics (Eco 341K) to the set of upper-division economic courses required for the Economics major, increasing the hours required for the major from 25 hours (including 19 upper-division) to 28 hours (including 22 upper-division). We also propose to change the math requirement for the BA in Economics.

Econometrics (Eco 341K) is the sequel to Economic Statistics (Eco 329). Previously, it was an upper-division elective. Under the proposed change, it will be an additional required core economics course.

The math department offers two calculus sequences: Math 408C/D, and Math 408K/L/M. The latter sequence covers essentially the same material as the former, but in three semesters. Previously, the BA in Economics required either sequence in its entirety. Under the proposed change, an economics major must take either Math 408C/D (as before), or Math 408K/L (not M), or the equivalent.

Indicate pages in the Undergraduate Catalog where changes will be made: Pg. 321

GIVE A DETAILED RATIONALE FOR CHANGE(S):

With the proposed change in the math requirement, all economics majors will be able to start taking their upper-division core theory and statistics courses after two semesters of introductory economics and math (rather than three semesters of math). This will result in better outcomes for many students (discussed below). The one topic from Math 408M that is necessary for economics—constrained optimization—will be taught in the first theory course (Microeconomic Theory, Eco 420K). Since optimization is central to Microeconomic Theory, it is quite natural to incorporate that topic (indeed, many instructors already cover that topic because it is so important). The proposed addition of Econometrics (Eco 341K) as a required upper-division core course will increase the statistics skills of economics majors very substantially. This will benefit our majors while in the program and upon graduation (discussed below). The net addition of three upper-division credit hours will increase the quality of the UT economics major, bringing it into line with major requirements at many other top universities. Importantly, it will do
so in a way that we believe will not discourage the large number of double majors and
dual degree students in the economics department (discussed below).

At present, the requirements for the major are:
- Two introductory economics courses (Eco 304K/L)
- Math (Math 408C/D or Math 408K/L/M)
- Two upper-division theory courses (Eco 420K, Eco 320L)
- Upper-division statistics (Eco 329)
- Three upper-division economics electives (at least two must have Eco 420K as a
  prerequisite)

Under the proposed changes, the requirements for the major will become:
- Two introductory economics courses (Eco 304K/L)
- Math (Math 408C/D or Math 408K/L, omitting M)
- Two upper-division theory courses (Eco 420K, Eco 320L)
- Two upper-division statistics/econometrics courses (Eco 329 and Eco 341K)
- Three upper-division economics electives (at least two must have Eco 420K as a
  prerequisite)

Change in the math requirement
At present, the math requirement creates two problems. One is that students who utilize
the three-semester sequence are delayed in taking Microeconomic Theory (Eco 420K),
which in turn causes other problems. Another is the inconsistency between the math
requirements for economics majors and business students who are required to take
Microeconomic Theory. The proposed change in the math requirement solves both
problems, with very little cost in terms of adjusting the content of Microeconomic
Theory. Other ways of solving these problems were discussed, but they are infeasible or
very costly or inferior in that they give rise to other problems.

Students must complete their math requirement before starting the required theory
sequence, consisting of Microeconomic Theory (Eco 420K) and Macroeconomic Theory
(Eco 320L). Microeconomic Theory is required for Macroeconomic Theory, and for the
majority of upper-division economics electives, including Econometrics.
Macroeconomic Theory is required or useful for several electives, including Money and
Banking, Monetary Economics, International Finance, and Development Economics.
Econometrics is useful for reading empirical research in many electives, and it greatly
increases the set of possible research topics for undergraduate honors theses. Taking
Microeconomic Theory in the third rather than fourth semester therefore provides more
room in students’ schedules to take electives they may prefer (those requiring
Microeconomic Theory and/or Macroeconomic Theory), and to reap gains from taking
Econometrics.

Constrained optimization is the only topic in Math 408M that is used in Microeconomic
Theory and Macroeconomic Theory. As mentioned above, many instructors of
Microeconomic Theory already cover that topic, for several reasons: it is a central topic,
so it gets reviewed (or extended); it is helpful to economics students to see this
mathematical technique presented in the context of economic problems; and business school students who are required to take Microeconomic Theory are not required to take Math 408M, so they have not seen it (the business school requires Math 408K/L or Math 408C/D). Thus, very little adjustment to the content of Microeconomic Theory will be necessary to ensure that the same material is learned by economics majors as before, and at the same level of mathematical rigor.

About half of economics majors now satisfy their math requirement by taking (either at UT or by transfer credit) the three-semester sequence (Math 408K/L/M) rather than the equivalent two-semester sequence (Math 408C/D). There is a discussion below of how our proposed change would affect enrollment in these two math sequences.

Adding Econometrics (Eco 341K) as a major requirement
The tools of econometrics benefit economics majors in several ways. Most fields of economics that are represented in our upper-division elective courses use econometric methods to test theories and to measure the effects of economic policies. While undergraduates will not get to the point where they can read such research in its original form, key empirical results can be explained to undergraduates who have had econometrics. Also, econometrics greatly expands the set of topics students can handle for honors theses and other research papers. Finally, econometrics is a marketable skill. In Econometrics, students do an empirical project that applies the statistical techniques they have learned to a data set. Recruiters often mention that they would like economics students to be able to show them such a project as evidence of their quantitative and analytical skills.

In the past several years, a number of excellent and user-friendly statistical and computational packages for personal computers have become available, including Minitab, Matlab, and Mathematica. This alleviates the constraint on the scale of the department’s offering of Econometrics that historically was imposed by computer lab space, and lab supervision and assistance.

Most likely the added requirement of Econometrics will result in Economic Statistics (Eco 329) being taught in larger sections than before. The only way to avoid this, while giving all economics majors some training in econometrics, would have been a four credit statistics course (225 minutes of class time per week) covering basic statistics and some econometrics in one semester. Some economics departments have such a course. In order to compare adding Econometrics as a requirement with this alternative, we developed a plan for a one-semester, four credit applied econometrics course (we blocked out lectures, and theoretical and computer assignments). The plan for this course was discussed by a working group of faculty who teach statistics and econometrics, and the options were circulated and discussed in the department. The department unanimously voted that the option of adding Econometrics as a requirement is preferred to a one-semester four credit applied econometrics course, and also to the status quo. We view the proposed changes as creating the biggest gains to the outcomes for economics majors.

Increase of three required credit-hours of economics
The proposed change adds Econometrics (Eco 420K) as a requirement; it does not substitute it for an elective. This increase results in a number of required credit-hours that is in line with economics majors at many top universities. It does not exceed the number typically required by other departments in the COLA. We view this as an improvement in quality that will benefit our majors. The impact on the feasibility of double majors and dual degree students was an important consideration in our discussion of this change, since we want students to be able to pursue diverse interests, many of which have synergies with economics. The business school is implementing an analogous change (all business students will take an econometrics course as well as statistics), so dual degree students with the business school will not be adversely affected. Because Econometrics is a quantitative course, as a practical matter all economics majors doing a dual degree with math, or a minor in math, or preparing themselves for graduate school in economics already take Econometrics. Double majors with other departments will experience an increase in required credit-hours. We believe that the added flexibility to plan, due to the revised math requirement, will allow such students to accommodate both of their majors, and they will end up with a higher quality outcome (they’ll learn just as much math, and more economics).

**SCOPE OF THE PROPOSED CHANGE(S):**

**Does this proposal impact other colleges/schools? If yes, then how?**

The economics department predicts that the proposed changes will reduce enrollment in Math 408M, and also shift some enrollment from Math 408C/D to Math 408K/L.

Under the proposed changes, some economics majors who would have taken Math 408C/D under the 2008-10 catalog will choose to take Math 408K/L instead. These are students who wanted to get through their math requirement in two semesters. (These students may be doing a double major or a dual degree, they may want to do a semester or year abroad, or they may have gotten a late start on their economics major.) Previously Math 408C/D was their only option for doing this. Now some of them will choose the first two semesters of the sequence that has a slower pace. In addition, most economics majors who would have taken Math 408K/L/M under the 2008-10 catalog now will take only the first two semesters of the sequence. (Some students, mostly those doing a dual degree in math and economics, economics majors with a math minor, and economics majors preparing to apply to a Ph.D. in economics, will take Math 408C/D, or the entire Math 408K/L/M sequence.)

Note that we expect the impacts of the proposed changes to begin almost immediately, as some students who could choose to be governed by the 2008-10 catalog instead choose to be governed by the 2010-12 catalog. (Some students who would have taken Math 408M in Spring 2010 may not take it, since they will be able to take Eco 420K during Fall 2010 regardless. Similarly, some students who would have taken Math 408C/D during the 2009-10 academic year may take Math 408K/L instead, since they also will be able to take Eco 420K during Fall 2010 by choosing to be governed by the new catalog.)
Compared to the major requirements of the 2008-10 catalog, such students will have to take at least three upper-division economics courses with an Eco 420K (Microeconomic Theory) prerequisite, instead of two, and one of them must be Econometrics (Eco 341K). Since the specific material from Math 408M that is needed for the economics major (constrained optimization) will be taught in Eco 420K starting Fall 2010, choosing to be governed by the 2010-12 catalog will maximize the amount learned for the same number of courses, and therefore this is a perfectly reasonable course of action for students to choose.

While it is impossible to form a precise numerical forecast of the impact on enrollments in the various math courses that will be affected, here is our best attempt at an approximate upper bound. These forecasts are for the impact once all economics majors are governed by the 2010-12 catalog. We should emphasize that these are rough estimates.

Our most recent detailed data set on exactly how economics majors satisfy their math requirement covers all majors who passed Eco 420K during the Fall 2007-Spring 2008 academic year. (Students who failed to get a C or better are omitted, as are accounting majors. Summer sessions are not included.) Just over half took and passed Math 408D at UT. The remainder are approximately evenly divided between students who took and passed Math 408M at UT, and those who transferred credit for Math 408M or Math 408D from elsewhere (almost all of these transferred Math 408M). The number of students was 370 (about 2/3 of enrollment in 420K during those two semesters, the remainder being business school students). Enrollment in Eco 420K has been roughly stable over the past several years. Therefore, it seems reasonable to use these data to form an approximate forecast.

Suppose (i) only 10% of students who would have chosen Math 408C/D at UT under the old catalog stay with that choice under the new catalog, (ii) no one who would have taken Math 408K/L/M at UT under the old catalog takes the third course, and (iii) the percentage of students transferring math credits to satisfy the requirement does not change. Also, assume a cohort size of 450 economics majors (applying the 2/3 factor to recent annual enrollment in Eco 420K, including the summer sessions). These assumptions seem reasonable for the purpose of approximation, and they seem conservative in the sense that they seem more likely to overstate the impact on math enrollments rather than understate it.

Under these assumptions, annual enrollment in Math 408C/D will decrease by about 200, annual enrollment in Math 408K/L will increase by about 200, and annual enrollment in Math 408M will decrease by about 110. Again, these are very rough estimates.

Has the other college(s)/school(s) been informed of the proposed change? If so, please indicate their response.

Person communicated with: Dr. Kathy Davis, Undergraduate Advisor, Department of Mathematics (davis@math.utexas.edu)
Date of Communication: May 1, 2009 (email from Dr. Valerie Bencivenga, Director of Undergraduate Studies, benciven@eco.utexas.edu, copy available)

At an early stage of discussion about possible changes to requirements for the economics major, a working group from the economics department met with Kathy Davis. The math department has been aware of the possible changes we are proposing, for more than a year. Kathy did not reply to the May 1, 2009 email, which confirmed that the economics department had decided to propose changing the math requirement as described here.

Will this proposal change the number of required hours for degree completion? If yes, please explain: No.

Does this proposal involve changes to the core curriculum (42-hour core, signature courses, flags)? No.

COLLEGE/SCHOOL APPROVAL PROCESS:

Department: Yes Date: April 17, 2009

College: Yes No Date:

Dean: Yes No Date:

Please include a draft of the catalog copy on an attached page. The draft should be based on the text of the current catalog available at http://www.utexas.edu/faculty/council/pages/catalog_chgs/catcopy.html.
On page 321, under the heading **DEGREES**, in the **MAJORS AND MINORS** subsection of the College of Liberal Arts chapter of the *Undergraduate Catalog, 2008-2010*, make the following changes:

**Economics**

All economics majors must earn grades of at least C- in either Mathematics 408C and 408D or Mathematics 408K and 408L, and 408M. Mathematics 403K and 403L (and transfer equivalents) may not be substituted for the required math courses.

**Major:** Twenty-five Twenty-eight semester hours of economics, consisting of Economics 304K, 304L, 420K, 320L, 329, and 341K and nine additional hours of upper-division coursework. At least six of the additional hours of upper-division coursework must be in courses for which a grade of at least C- in Economics 420K is a prerequisite. Economics 420K, 320L, and 329 and 341K must be completed in residence. Economics majors must take Economics 420K at least two semesters prior to completion of the degree. Students may not enroll in Economics 420K more than twice.

All economics majors must earn grades of at least C- in Economics 304K, 304L, 420K, 320L, 329, and 341K. Furthermore, all economics majors must earn a grade point average of at least 2.00 in all economics courses (excluding Economics 420K, 320L, and 329, and 341K) taken at the University and counted toward fulfillment of the major requirement. No student may register for more than ten semester hours of economics in any one semester without approval of an undergraduate adviser in the Department of Economics.