PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(500-600 LEVEL)

DEPARTMENT Civil Engineering
EFFECTIVE SESSION Fall 2008

GRADUATE COUNCIL DOCUMENT NO. 08-9c

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

[ ] 1. New course with supporting documents (complete proposal form)
[ ] 2. Add existing course offered at another campus
[ ] 3. Expiration of a course
[ ] 4. Change in course number
[ ] 5. Change in course title
[ ] 6. Change in course credit/length

PROPOSED:
Subject Abbreviation CE
Course Number 615 00
Long Title Statistical and Econometric Methods II
Short Title Stat Econometric II
Abbreviated title will be entered by the Office of the Registrar if omitted. (02 CHARACTERS ONLY)

CRED TYPE
1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range:
Minimum Cr. Hrs. (Check One) To Or
Maximum Cr. Hrs.
3. Equivalent Credit: Yes [x] No
4. Thesis Credit: Yes [x] No

COURSE ATTRIBUTES:
1. Pass/Not Pass Only
2. Satisfactory/Unsatisfactory Only
3. Repeatable
4. Maximum Repeatable Credit:
5. Designator Required
6. Special Fees

INSTRUCTIONAL TYPE
Lecture
Practical
Independent
Laboratory
Lab Prep
Studio
Distance
Clinic
Experimental
Research
Ind. Study
Pract/Observ

DELIVERY METHOD
Delivery Medium (Audio, Internet, Live, Text-Based, Video)
% of Credit Allocated
Delivery Method (Asyn. Or Syn.)
Min. Per Wk
16
Weeks Offered
16
Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES):
Sem. 2. Credit 3. cr.
Prerequisite: CE 614 (Statistical and Econometric Methods I), by permission of instructor.
Advanced statistical and econometric methods as applied to engineering-related problems extending the techniques covered in CE 614 (Statistical and Econometric Methods I). Topics include seemingly unrelated regression, three-stage least squares, generalized extreme value models, nested logit models estimated by full information maximum likelihood, random parameters (mixed) logit models, and models with fixed and random effects, and zero-inflated count-data models.

Professor, Mannerian.

OFFICE OF THE REGISTRAR
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☐ 5. Change in course title
☐ 6. Change in course credit/type
☐ 7. Change in course attributes
☐ 8. Change in instructional hours
☐ 9. Change in course description
☐ 10. Change in course requisites
☐ 11. Change in semesters offered
☐ 12. Transfer from one department to another

PROPOSED:
Subject Abbreviation CE
Course Number 615
Long Title Statistical and Econometric Methods II
Short Title Stat Econometric II

EXISTING:
Subject Abbreviation
Course Number
Long Title
Short Title

Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
☐ Summer ☐ Fall ☑ Spring

CAMPUS(ES) INVOLVED
Calumet Cont Ed N. Central
Ft. Wayne Tech Statewide
Indianapolis ☑ W. Lafayette

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. __________
2. Variable Credit Range: Minimum Cr. Hrs. __________
   (Check One) ☐ To ☐ Or ☐
   Maximum Cr. Hrs. __________
3. Equivalent Credit: Yes ☑ No ☐
4. Thesis Credit: Yes ☑ No ☐

INSTRUCTIONAL TYPE
Lecture __________
Recitation __________
Presentation __________
Laboratory __________
Lab Prep __________
Studio __________
Distance __________
Clinic __________
Experiential __________
Research __________
Ind. Study __________
Prac/Observ __________

Meetings Per Week 1
Minutes Per Mtg 150
Weeks Offered 16
% of Credit Allocated 100
Delivery Method (Asyn. Or Syn.) __________
Delivery Medium (Audio, Internet, Live, Text-Based, Video) __________

COURSE ATTRIBUTES: Check All That Apply
7. Registration Approval Type
   Department ☐ Instructor ☑
8. Variable Title ☐
9. Remedial ☑
10. Honors ☐
11. Full Time Privilege ☐
12. Off Campus Experience ☐

COURSE DESCRIPTION (INCLUDE REQUISITES):
Sem. 2. Class 3. Cr. 3
Prerequisite: CE 614 (Statistical and Econometric Methods I) or permission of instructor.
Advanced statistical and econometric methods as applied to engineering-related problems – extending the techniques covered in CE 614 (Statistical and Econometric Methods I). Topics include Seemingly Unrelated Regression, three-stage least squares, generalized extreme value models, nested logit models estimated by full information maximum likelihood, random parameters (mixed) logit models, models with fixed and random effects, and zero-inflated count-data models.

Calumet Department Head Date ____________________________
Calumet School Dean Date ____________________________
Calumet Undergrad Curriculum Committee Date ____________________________
Fort Wayne Department Head Date ____________________________
Fort Wayne School Dean Date ____________________________
Fort Wayne Chancellor Date ____________________________
Undergrad Curriculum Committee Date ____________________________
Indianapolis Department Head Date ____________________________
Indianapolis School Dean Date ____________________________
North Central Department Head Date ____________________________
North Central Chancellor Date ____________________________
Undergrad Curriculum Committee Date ____________________________
West Lafayette Department Head Date 04/23/08 ____________________________
West Lafayette School Dean Date ____________________________
West Lafayette Registrar Date ____________________________
Graduate Dean Date ____________________________
North Central Chancellor Date ____________________________
Office of the Registrar
To: Purdue University Graduate Council
From: Faculty Member: Fred Mannering
Department: Civil Engineering
Campus: West Lafayette
Date: April 28, 2008
Subject: Proposal for New Graduate Course/Documents Supporting Registrar's
Form 40

Contact information if questions arise
Name: Becky Hull
Phone Number: 62379
E-mail: bhull@purdue.edu
Course Number: CE 615
Campus Address: CIVL 1147
Course Title: Statistical Econometric Methods II

A. Justification for the Course
   X Explain how this course relates to other courses offered in the department or other departments and how this course fulfills a recognized need.

   X This course is intended primarily for students Choose one: from within this department

B. Level of the course:
   X Justify request for graduate course level by indicating anticipated enrollments of undergraduate and graduate students.
     Anticipated Undergraduate Student Enrollment: None
     Anticipated Graduate Student Enrollment: 100%

C. Prerequisites: (if none, please explain reasons for absence)
   X CE 614 (Statistical and Econometric Methods I) or permission of instructor.

D. Course Instructor:
   X Instructor's Name Fred Mannering

E1. Course Outline:
   X (An outline of topics to be covered and an indication of the relative emphasis or time devoted to each topic is necessary. If laboratory or field experience is involved, the nature of this component should be explained as well).

E2. X Method of Evaluation or Assessment:
   See attached

F. Reading List:
   X A reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.
MEMORANDUM

TO: The Engineering Faculty

FROM: The Faculty of the School of Civil Engineering

RE: New Graduate Level Course CE 615

The faculty of the School of Civil Engineering has approved the following new course. This action is now submitted to the Engineering Faculty for a recommendation for approval.

CE 615  Statistical and Econometric Methods II

Sem. 2, Class 3, Cr. 3

Prerequisite: CE 614 (Statistical and Econometric Methods I) or permission of instructor.

Advanced statistical and econometric methods as applied to engineering-related problems – extending the techniques covered in CE 614 (Statistical and Econometric Methods I). Topics include Seemingly Unrelated Regression, three-stage least squares, generalized extreme value models, nested logit models estimated by full information maximum likelihood, random parameters (mixed) logit models, models with fixed and random effects, and zero-inflated count-data models.

Reason: To provide students with the knowledge on advanced econometric methods to be used for their M. S. and PhD research in all areas of engineering. This course has been taught twice as CE697M.

M. Katherine Banks, Head
School of Civil Engineering

APPROVED FOR THE FACULTY OF THE SCHOOLS OF ENGINEERING BY THE ENGINEERING CURRICULUM COMMITTEE

ECC Minutes #22
Date 4-9-08
Chairman EGC Michael J. Trush

Supporting documentation

1. **Justification:** CE 614 (Statistical and Econometric Methods I) provides the basic background for students with regard to a wide variety of statistical and econometric methods. This course solidifies and extends the concepts in CE 614 by providing students model-estimation experience with more technically advanced methods.

2. **Level:** Graduate Level

3. **Prerequisites:** CE 614 (Statistical and Econometric Methods I) or permission of instructor.

4. **Instructor:** Fred Mannering

5. **Course objectives:** The objective of this course is to solidify students' understanding of the material taught in CE 614 (Statistical and Econometric Methods I) and to extend students' knowledge with the presentation of new model estimation techniques not covered in that course. Specifically, the course undertakes a detailed assessment of simultaneous equations models (seemingly unrelated regressions and three-stage least squares), generalized extreme value models (nested logit models estimated by full information maximum likelihood), mixed logit models (to account for variations in parameters across the sample population), models with fixed and random effects, zero-inflated count data models, and selectivity models (discrete/continuous frameworks).

6. **Course Outline:**

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td>Course introduction</td>
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<tr>
<td>2</td>
<td>Seemingly unrelated regressions (Text chapter 5)</td>
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<tr>
<td>3</td>
<td>Analysis of temporal stability with likelihood ratio and Chow tests (Text pages 109-110 and 282)</td>
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<tr>
<td>4</td>
<td>Three-stage least squares (Text chapter 5)</td>
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<td>5</td>
<td>Zero-inflated count models (Text chapter 10)</td>
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<tr>
<td>6</td>
<td>Paper critiques</td>
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<tr>
<td>7</td>
<td>Paper critiques</td>
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<tr>
<td>8</td>
<td>Fixed and random effects models, random effects ordered probit model (Text chapter 6, pages 157-160)</td>
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<tr>
<td>9</td>
<td>Nested logit models with full information maximum likelihood (Text chapter 11)</td>
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<tr>
<td>10</td>
<td>Mixed logit models (Text chapter 11)</td>
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<tr>
<td>11</td>
<td>Discrete/continuous models (Text chapter 11)</td>
</tr>
<tr>
<td>12</td>
<td>Research presentations</td>
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<td>13</td>
<td>Project discussions and issues</td>
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<tr>
<td>14</td>
<td>Recent econometric applications I</td>
</tr>
<tr>
<td>15</td>
<td>Recent econometric applications II</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

8. The course has been previously taught 2 times as CE697M with the following enrollments and student ratings:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Number of Students</th>
<th>Core 1 (course) question&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Core 2 (instructor) question&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 697M</td>
<td>F06</td>
<td>8</td>
<td>4.8</td>
<td>4.9</td>
</tr>
<tr>
<td>CE 697M</td>
<td>S07</td>
<td>9</td>
<td>4.9</td>
<td>4.9</td>
</tr>
</tbody>
</table>

<sup>a</sup> All students were asked to rate the courses below on a scale of 1-5 [1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = excellent]. The two university core questions are: **Core 1,** Overall I would rate this course as:; **Core 2,** Overall I would rate this instructor as:. Median scores for these questions are presented in the table.

9. The course website with all assignments, datasets, etc. can be accessed at the following: http://bridge.ecn.purdue.edu/~flm/697M.htm

10. The most recent course syllabus is appended on the following pages.
The objective of this course is to solidify students' understanding of the material taught in CE697N (Statistical and Econometric Methods I) and to extend students' knowledge with the presentation of new model estimation techniques not covered in CE697N. Specifically, we will undertake detailed assessment of simultaneous equations models (seemingly unrelated regressions and three-stage least squares), generalized extreme value models (nested logit models estimated by full information maximum likelihood), mixed logit models (to account for variations in parameters across the sample population), models with fixed and random effects, zero-inflated count data models, and selectivity models (discrete/continuous frameworks).

**Time and location:**
Spring semester, Thursdays 5:30-8:30, in room CIVL 1129

**Website:**
http://bridge.ecn.purdue.edu/~flm/697M.htm

**Course requirements:**

- Empirical assignments. All involve data analysis with existing databases. Students will present a short presentation of findings after each assignment.
- Research critique. During the semester, each student will be asked to critique a methodological paper in their field of interest and present to the class.
- Students will complete a research paper using the methods covered in the course.

**Grade distribution:**
Empirical assignments (30%), Research paper (30%), Final exam (40%)

**Prerequisites:**
CE697N (Statistical and Econometric Methods I) or permission from instructor.

**Required materials:**
## Course contents

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>(Text pages)</th>
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<td>282</td>
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<td>(Text chapter 10)</td>
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<td>Week 7</td>
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<tr>
<td>Week 9</td>
<td>Nested logit models with full information maximum likelihood</td>
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<td>(Text chapter 11)</td>
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