The Ohio State University
Colleges of the Arts and Sciences New Course Request

Economics
Academic Unit
ECON
Book 3 Listing (e.g., Portuguese)
841 Advanced Econometrics I
Number Title
Adv Econometrics I G 05
18-Character Title Abbreviation Level Credit Hours

Summer Autumn Winter X Spring Year 2007
Proposed effective date, choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. Course Offerings Bulletin Information

Follow the instructions in the OAA curriculum manual. If this is a course with decimal subdivisions, then use one New Course Request form for the generic information that will apply to all subdivisions; and use separate forms for each new decimal subdivision, including on each form the information that is unique to that subdivision. If the course offered is less than a quarter or a term, please complete the Flexibly Scheduled/Off Campus/Workshop Request form.

Description (*not to exceed 25 words*): **This course covers selected advanced topics in econometrics such as non- parametric and semiparametric estimation, numerical optimization, Markov chain, Monte Carlo methods and duration models used in economics.**

Quarter offered: Spring Distribution of class time/contact hours: 2-2 hr cl
Quarter and contact/class time hours information should be omitted from Book 3 publication (yes or no): yes

Prerequisite(s): Econometrics 742 or equivalent with instructor's consent

Exclusion or limiting clause:

Repeatable to a maximum of __10___ credit hours.

Cross-listed with: N/A

Grade Option (Please check): Letter ☒ S/U ☐ Progress ☐ What course is last in the series? _____

Honors Statement: Yes ☐ No ☒ GEC: Yes ☐ No ☒ Admission Condition
Off-Campus: Yes ☐ No ☒ EM: Yes ☐ No ☒ Course: Yes ☐ No ☒
Embedded Honors Statement: Yes ☐ No ☐

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

B. General Information

Subject Code____450601_____Subsidy Level (V, G, T, B, M, D, or P)_____D_____
If you have questions, please email Jed Dickhaut at dickhaut.1@osu.edu.

1. Provide the rationale for proposing this course:

The main focus of this course is on nonparametric and semiparametric estimation and related topics. The objective is to enhance the understanding of the workings of these estimation procedures in the context of economic analysis and to provide theoretical justifications. Students should be able to commence research in applied econometrics and to appreciate research articles in econometrics theory.

2. Please list Majors/Minors affected by the creation of this new course. Attach revisions of all affected programs.
This course is (check one): ☐ Required on major(s)/minor(s) ☐ A choice on major(s)/minors(s)
☐ An elective within major(s)/minor(s) ☒ A general elective:

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.
N/A

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes ☐ No ☒ List:

5. If this course is part of a sequence, list the number of the other course(s) in the sequence:

6. Expected section size: 25 Proposed number of sections per year: 1

7. Do you want prerequisites enforced electronically (see OAA manual for what can be enforced)? Yes ☐ No ☒

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*):
Not Applicable ☐

Concurrence received from Department of Finance and Department of Agricultural, Environmental and Developmental Economics.

9. **Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the OAA curriculum manual and e-mail to asccurrofc@osu.edu.**

Approval Process The signatures on the lines in ALL CAPS (e.g. ACADEMIC UNIT) are required.

1.	Academic Unit Undergraduate Studies Committee Chair	Printed Name Hajime Miyazaki	Date 02/20/2007
2.	Academic Unit Graduate Studies Committee Chair	Printed Name Masanori Hashimoto	Date 02/20/2007
3.	**ACADEMIC UNIT CHAIR/DIRECTOR**	**Printed Name**	**Date**

4. **After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 105 Brown Hall, 190 West 17th Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to asccurrofc@osu.edu. The ASC Curriculum Office will forward the request to the appropriate committee.**

5.	**COLLEGE CURRICULUM COMMITTEE**	**Printed Name**	**Date**
6.	**ARTS AND SCIENCES EXECUTIVE DEAN**	**Printed Name**	**Date**
7.	Graduate School (if appropriate)	Printed Name	Date
8.	University Honors Center (if appropriate)	Printed Name	Date
9.	Office of International Education (if appropriate)	Printed Name	Date
10.	**ACADEMIC AFFAIRS**	**Printed Name**	**Date**

Economics 841
Advanced Econometrics I

Spring 2007
S. R. Cosslett

05 credit hours
G: course listing
Grade: Letter Grade
Repeatable to a maximum 10 credit hours

Prerequisites: Economics 742 (Econometrics II) or equivalent with instructor's consent.

Course Abstract: This course will cover selected advanced topics in econometrics, such as nonparametric and semiparametric estimation, numerical optimization, simulation methods, Markov chain Monte Carlo (MCMC) methods, and duration models.

Lectures: twice a week, each 108 minutes long:
Time and Place (TBA): tentatively Tuesday and Thursday 12:30AM-2:18PM

Instructor: Professor Stephen Cosslett
Office Hours: Mon, Wed, Thurs. 3:30–4:30 PM and by appointment.
Office: Arps Hall 455A
Phone 292-4106
Email: cosslett.1@osu.edu

Course Objectives: This course is an integral part of the econometrics field sequence leading to the second-year field exams for Ph.D. students in economics. This course can be taken concurrently or independently of Economics 840 (Time Series Econometrics), Economics 842 (Advanced Econometrics II), and can serve as a recommended course before taking Economics 843 (Research Topics in Micro Econometrics). Students should be able to commence on research in applied econometrics and to appreciate frontier research articles in econometric theory. This main focus of this course is on nonparametric and semiparametric estimation and related topics. The objective is to enhance understanding of the workings of these estimation procedures in the context of economic analysis and to provide theoretical justifications.

Course Grade: Term Paper (40%), Occasional Assignments (30%), In-class presentation (30%). Students are required to write a term paper on an econometric topic of their choice subject to the instructor's approval. The paper may be a substantial research proposal or critical survey of the literature. The term paper need not be purely theoretical or methodological, but can be an empirical study with a sufficiently rigorous econometrics content. In addition, each student must give an in-class presentation of the term paper topic (approximately 25 minutes) in the latter half of the quarter, according to the following due dates:

Provisional topic to be determined:	May 2
Outline of paper (1 page):	May 9
Final version of paper:	June 8 (exam week)

There will be no in-class final examination, but depending on the class size, part of the occasional assignments may be substituted by in-class quizzes or a mid term exam.

ACADEMIC MISCONDUCT

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentaffairs.osu.edu/info_for_students/csc.asp>.

Course Material:

Recommended Textbooks

W. H. Greene, *Econometric Analysis*, 5th ed, Prentice Hall, 2003

A. Pagan and A. Ullah, *Nonparametric Econometrics*, Cambridge University Press, 1999.

T. Amemiya, *Advanced Econometrics*, Harvard University Press, 1985.

Reference textbooks for nonparametric and semiparametric estimation:

B. W. Silverman, *Density Estimation for Statistics and Data Analysis*, Chapman and Hall, 1986.

W. Härdle, *Applied Nonparametric Regression*, Cambridge University Press, 1990.

W. Hardle and O. Linton, "Applied Nonparametric Methods" in Volume 4, *Handbook of Econometrics*

J. L. Powell, "Estimation of Semiparametric Models" in Volume 4, *Handbook of Econometrics*

Reference textbooks for asymptotic theory

J. Davidson, *Stochastic Limit Theory*, Oxford University Press, 1994.

Additional readings and references will be announced as the class evolves.

COURSE OUTLINE

1. Nonparametric estimation and related topics (Lectures 1, 2, 3, 4)

   Kernel density estimation

   Histogram, nearest-neighbor estimator, kernel estimator, adaptive kernel estimator.
   Orthogonal series methods, spline-fitting methods.
   Statistical properties of kernel estimators, bias reduction, multivariate density estimation.
   Cross-validation methods for choosing the kernel window width.

[Pagan and Ullah, sections 2.2–2.5 and 2.7–2.8; see also Silverman, chapters 2–4, and Greene, section 16.4.1]

Nonparametric regression

Nadaraya-Watson estimator, local linear and local polynomial regression estimators.
[Pagan and Ullah, section 3.2 — main points only; see also Greene, section 16.4.2]

Statistical properties of the Nadaraya-Watson estimator
[Pagan and Ullah, sections 3.3.1 and 3.4.1 — main points only]

Series methods for nonparametric regression (semi-nonparametric estimation)
[Pagan and Ullah, sections 3.8–3.9]

2. Semiparametric estimation — selected topics (Lectures, 5, 6, 7, 8, 9, 10, 11)

Average derivative estimators

[Pagan and Ullah, sections 4.3.3 and 4.6]
J. L. Powell, J. H. Stock, and T. H. Stoker, "Semiparametric Estimation of Index Coefficients", *Econometrica* 57, 1403-1430, 1989

Semiparametric least squares estimator for single-index models

H. Ichimura, "Semiparametric Least Squares (SLS) and Weighted SLS Estimation of Single-Index Models," *Journal of Econometrics* 58, 71-120, 1993.
[Pagan and Ullah apply this method to the binary choice model in section 7.4.1]

Efficiency bounds

[Pagan and Ullah, section 5.4 — main points only]

Adaptive estimation of the linear regression model

[Pagan and Ullah, section 5.5.4]

Semiparametric estimators of the binary choice model

Maximum score estimator [Pagan and Ullah, sections 7.5.1–7.5.2]

C. F. Manski, "The Maximum Score Estimation of the Stochastic Utility Model of Choice," *Journal of Econometrics* 3, 205-228, 1975
J. L. Horowitz, "A Smoothed Maximum Score Estimator for the Binary Response Model," *Econometrica* 60, 505-531 (1992)

Klein-Spady estimator [Pagan and Ullah, section 7.4.2]

R. W. Klein and R. H. Spady, "An Efficient Semiparametric Estimator of Binary Response Models," Econometrica 61, 387-421, 1993

3. Numerical optimization methods (Lectures 12, 13)

Greene discusses several numerical optimization methods in Appendix E.6.

A useful reference is W. H. Press et al., *Numerical Recipes*, Cambridge University Press, which contains several chapters on numerical optimization. There are different editions of the book

giving examples in different computer languages (such as C, C++, and Fortran), which most people won't need, but there are good explanations of how the different algorithms work.

4. Simulation methods (Lectures 14, 15, 16, 17)

Greene, Appendix E.2–E.5, gives an overview of random number generation, the Gibbs sampler, Monte Carlo studies, and bootstrapping.

Reference for bootstrap theory: J. L. Horowitz, "The Bootstrap," in Volume 5 of the *Handbook of Econometrics*

Markov chain Monte Carlo (MCMC) simulation [Greene, section 16.2.4]

MCMC simulation is mainly (but not exclusively) used in Bayesian estimation, so we'll have a brief introduction to Bayesian econometrics [see Greene, section 16.2.2 for more details and references].
MCMC in econometrics: S. Chib and E. Greenberg, *Econometric Theory* 12, 409-431, 1996

Data augmentation: J. Albert and S. Chib, *Journal of the American Statistical Association* 88, 669-679, 1993.

Simulated moment estimation and simulated likelihood estimation
D. McFadden and P. A. Ruud, "Estimation by Simulation," *Review of Economics and Statistics* 76, 51-608, 1994.

GHK method for estimating multinomial probit.

5. Parametric models — selected topics (Lectures 18, 19, 20)

Duration-time models: Hazard rate, time-varying hazard rate, unobserved heterogeneity, right censoring, left censoring, proportional hazards model, competing risks model.

[Greene, section 22.5; Amemiya, section 11.2]
General reference: T. Lancaster, *The Econometric Analysis of Transition Data*, Cambridge University Press, 1992.

Semiparametric estimation of models with unobserved heterogeneity:

J. Heckman and B. Singer, "A Method for Minimizing the Impact of distributional Assumptions in Econometric models for Duration Data," *Econometrica* 52, 277-320, 1984.

This syllabus and other class materials are available in alternative formats upon request. Students with disabilities are responsible for making their need known to the instructor and seeking assistance in a timely manner. For more information, please contact the Office of Disability Services at 292-3307.