# Indian Institute of Management Kashipur
## PhD in Management
## Advanced Econometrics

### Term V, 2020-21

**Credit**: 1

## Instructor

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**Office Hours**:  By appointment

## Course Description

This course equips students with the advanced econometric tools for successful investigation of economic data. The course begins with instrumental variable regressions and panel data techniques, and proceeds to demand estimation, demand forecasting, production function estimation, and dynamic discrete choice structural models. The students will also learn how to implement these techniques using statistical software, and apply these concepts to answer questions empirically.

Students are required to stay up-to-date with the topics being discussed, and clear any doubt as soon as they arise. Quantitative techniques take a lot of effort to learn, and students need to devote significant amount of time and effort to develop the intuition and skill. If any student faces any problem or difficulty during the course, please discuss it with the instructor as early as possible.

This course will also teach students how to use the statistical software Stata and R. Stata and R are widely used in economics and social science research, and learning the software will immensely help the students in their research endeavors.

## Course Objectives

After completion of this course, students are expected to:

1. Understand advanced econometric concepts
2. Build econometric models to investigate economic issues
3. Distinguish among different econometric modeling techniques
5. Be able to apply econometric techniques for problems of demand estimation, production function estimation etc.
7. Be able to apply econometric techniques in their own research

## Required Textbook

Econometric Analysis of Cross Section and Panel Data, Second Edition by Jeffrey M. Wooldridge, MIT Press

## Pedagogy and Course Requirements

The course will be primarily taught though a combination of class discussions, presentations, and take-home assignments.

### Class Discussions

The class discussion will involve the readings assigned for the class, which may include book chapters, and articles. You are expected to have done all the assigned reading and to actively participate in these discussions.

### Course Project PLO 1e, 1f, 1i

As a part of this course, students will carry out a replication exercise using an already published paper on a topic of economics or management. Students need to take permission from the instructor before finalizing the replication paper. The paper should come from reputed journals (a list is given below). The students should also read and cite at least 25 articles, and at least 15 of them should be from the journals listed here. The term paper should not be more than 15 pages long (font size 12, single-spaced). The term paper should replicate the main results of the replication paper, and then use the data to answer a new question that extends the original insights provided in the paper being replicated. The term paper should contain a well-written methodology section including model specification, and a clearly explained results section.

List of journals:

Economics journals (Field of Research Code: 1401-1499) ranked A* or A in ABDC 2018 journal ranking.

Term paper will be due in: TBA

Late submissions will NOT be accepted for term paper.

## Grading

| Midterm Exam | 25% PLO 1a, 1b |
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| Final Exam | 25% PLO 1a, 1b |
| Assignments | 25% |
| Course Project | 25% |

# Tentative Class Schedule

**(Additional readings, cases and articles, may be assigned as they become available)**

| Session | Topic | Readings |
|---|---|---|
| 1 | Review of Econometric Concepts: Causality | Angrist, Joshua D., and Jörn-Steffen Pischke. 2010. "The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con out of Econometrics." Journal of Economic Perspectives, 24 (2): 3-30.<br><br>Nevo, Aviv, and Michael D. Whinston. 2010. "Taking the Dogma out of Econometrics: Structural Modeling and Credible Inference." Journal of Economic Perspectives, 24 (2): 69-82. DOI: 10.1257/jep.24.2.69 |
| 2 | Introduction to Stata and Indian Data Sources | Class Note |
| 3 | Instrumental Variables Regression | Wooldridge: Ch. 5<br><br>Angrist, J., and A. Krueger. "Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments." Journal of Economic Perspectives 15, no. 4 (2001): 69–85. |
| 4 | | Angrist, J., G. Imbens, et al. "Identification of Causal Effects Using Instrumental Variables." Journal of the American Statistical Association 91, no. 434 (1996): 444–55. |
| 5 | Matching | Ashenfelter, O., and D. Card. "Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs." The Review of Economics and Statistics 67, no. 4 (1985): 648–60. |
| 6 | Panel Data Models | Wooldridge: Ch. 10 |
| 7 | | Bond, S. R. (2002). Dynamic panel data models: a guide to micro data methods and practice. Portuguese economic journal, 1(2), 141-162. |
| 8 | Difference in Differences | Maiti, A. "Effect of Joint Custody Laws on Children's Future Labor Market Outcomes", International Review of Law and Economics 43: |

| | | 22-31. |
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| 9 | Regression Discontinuity Designs | Imbens, G., and T. Lemieux. "Regression Discontinuity Designs: A Guide to Practice." Journal of Econometrics 142, no. 2 (2008): 615–35. |
| 10-11 | Discrete Choice Models: Multinomial Logit | McFadden, D., 1974. The measurement of urban travel demand. Journal of public economics, 3(4), pp.303-328. |
| 12-13 | Discrete Choice Models: Further Issues | McFadden, Daniel, and Kenneth Train. "Mixed MNL Models for Discrete Response." Journal of Applied Econometrics 15, no. 5 (2000): 447-70. http://www.jstor.org/stable/2678603. |
| 14 | Discrete Choice Panel Data Models | Keane, Michael. "Panel Data Discrete Choice Models of Consumer Demand." In The Oxford Handbook of Panel Data: Oxford University Press, 2015-01-15. |
| 15 | Dynamic Discrete Choice Structural Models | Aguirregabiria, Victor, and Pedro Mira. "Dynamic discrete choice structural models: A survey." Journal of Econometrics 156, no. 1 (2010): 38-67. |
| 16 | Almost Ideal Demand System (AIDS) | Deaton, Angus, and John Muellbauer. "An Almost Ideal Demand System." The American Economic Review 70, no. 3 (1980): 312-26. http://www.jstor.org/stable/1805222. |
| 17 | Berry-Levinsohn-Pakes (BLP) Model | Berry, Steven, James Levinsohn, and Ariel Pakes. "Automobile prices in market equilibrium." Econometrica: Journal of the Econometric Society (1995): 841-890.<br><br>Nevo, A. (2000), A Practitioner's Guide to Estimation of Random-Coefficients Logit Models of Demand. Journal of Economics & Management Strategy, 9: 513-548. doi:10.1111/j.1430-9134.2000.00513.x |
| 18-19 | Overview of Econometric Models of Production Function Estimation | Ackerberg, Daniel, C. Lanier Benkard, Steven Berry, and Ariel Pakes. "Econometric tools for analyzing market outcomes." Handbook of econometrics 6 (2007): 4171-4276. |

| 20 | Ackerberg-Caves-Frazer (ACF) Model | Ackerberg, D. A., Caves, K. and Frazer, G. (2015), Identification Properties of Recent Production Function Estimators. Econometrica, 83: 2411-2451. doi:10.3982/ECTA13408 |
|---|---|---|
| 21 | Machine Learning and Economics | Athey, S., and Imbens, G. 2019. Machine Learning Methods Economists Should Know About. Annual Review of Economics, vol. 11 |
| 22 | Machine Learning and Causal Inference | Varian, Hal R. "Big Data: New Tricks for Econometrics." Journal of Economic Perspectives 28, no. 2 (2014): 3–28.<br><br>Athey, S. 2017. The Impact of Machine Learning on Economics. The Economics of Artificial Intelligence: An Agenda (2019), Ajay Agrawal, Joshua Gans, and Avi Goldfarb, editors (p. 507 - 547) |
| 23 | Machine Learning Methods for Demand Estimation | Bajari, Patrick, Denis Nekipelov, Stephen P. Ryan, and Miaoyu Yang. Demand estimation with machine learning and model combination. No. w20955. National Bureau of Economic Research, 2015. |
| 24 | Presentations | Student Term Paper |
| Final | | |

## Course Policies

1. **Responsibility for Course Materials**: You are responsible for all material covered in class. If you are absent, you are responsible for obtaining the information you missed.
2. **Classroom Behavior**: We expect you to participate in class activities in a mature and appropriate manner. Disruptive or otherwise unacceptable behavior will not be tolerated.
3. **Mobile and Laptop Use**: Mobiles and laptops are not permitted in the classroom. I will let you know beforehand if laptop is required for a class. In the class, you must keep your laptop down unless asked by the instructor.
4. **Academic Conduct:** All members of the academic community at IIM Kashipur are expected to practice and uphold standards of academic integrity and honesty. Academic integrity means representing oneself and one's work honestly. Misrepresentation is cheating since it means students are claiming credit for ideas or work not actually

theirs and are thereby seeking a grade that is not actually earned. Following are some examples of academic dishonesty:

   i. **Cheating on quizzes and examinations**. This includes using materials such as books and/or notes when not authorized by the instructor, copying from someone else's paper, helping someone else copy work, substituting another's work as one's own, theft of exam copies, or other forms of misconduct on exams.

   ii. **Plagiarizing the work of others**. Plagiarism is using someone else's work or ideas without giving that person credit; by doing this students are, in effect, claiming credit for someone else's thinking. Whether students have read or heard the information used, they must document the source of information. When dealing with written sources, a clear distinction should be made between quotations (which reproduce information from the source word-for-word within quotation marks) and paraphrases (which digest the source of information and produce it in the student's own words). Both direct quotations and paraphrases must be documented. Even if students rephrase, condense or select from another person's work, the ideas are still the other person's, and failure to give credit constitutes misrepresentation of the student's actual work and plagiarism of another's ideas. Buying a paper or using information from the World Wide Web or Internet without attribution and handing it in as one's own work is plagiarism.

   iii. **Falsifying records or providing misinformation regarding one's credentials**.

   iv. **Unauthorized collaboration on computer assignments and unauthorized access to and use of computer programs**, including modifying computer files created by others and representing that work as one's own.

   v. Unless they specifically indicate otherwise, instructors expect individual, unaided work on homework assignments, exams, lab reports and computer exercises, and documentation of sources when used. If instructors assign a special project other than or in addition to exams, such as a research paper, or original essay or a book review, they intend that work to be completed for that course only. Students must not submit work completed for a course taken in the past or for a concurrent course unless they have explicit permission to do so from both faculty members.

**Any academic misconduct will automatically result in a failing grade for the class and the student will be reported to the committee on academic misconduct for further disciplinary action**.

4. **Attendance:** As far as I am concerned, you are an adult and it is your decision whether or not you attend class. However, your decision not to attend a class may have negative consequences for your class grade. (Please consult PGP Participants' Handbook for this purpose).
If you decide to attend a class, you must come to the class and take your seat sufficiently before the beginning of the class time. Under no circumstances you would be allowed in once the class has started. You are expected to sit through the class unless

you have a prior permission from the instructor to leave the classroom before the end of the class.

5. **Late submission**: **Any late submission beyond the deadline (even by few seconds) will result in 0 point. Except in case of emergencies, with a doctor's note, any questions about late submission will not be entertained.**

6. **Missed exam**: **There is no make-up for the missed exams** unless the student has discussed and made an arrangement with the instructor for a valid reason beforehand. In all other instances, the student must produce a valid doctor's note for the day the student missed the exam. Such doctor's note must be produced in the same week the student missed the exam.

7. **Grade Discussion**: It is the student's responsibility to monitor his or her own grades and raise any questions s/he may have **within one week** of the grades assigned.

## Learning Accommodations

To provide equal access to the educational programs and opportunities, IIM Kashipur is dedicated to providing appropriate accommodations to students with documented disabilities such as attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help them achieve their academic and personal potential. These academic accommodations are provided to students at no cost.

## Inclusivity Statement

IIM Kashipur believes that diversity and inclusiveness are essential to excellence in education and innovation. Our community represents a rich variety of backgrounds, experiences, demographics, and perspectives. IIM Kashipur is committed to fostering a learning environment where every individual is respected and engaged. To facilitate a dynamic and inclusive educational experience, we ask all members of our community to:

- be open to the perspectives of others
- appreciate the uniqueness of their colleagues
- take advantage of the opportunities to learn from each other
- exchange experiences, values, and beliefs
- communicate in a respectful manner
- be aware of the individuals who are marginalized and involve them
- keep confidential discussions private