Course Title: Econometrics					
Course Code: MPE 172		**No. of credits:** 4	**L-T-P:** 54-0-12		**Learning hours:** 60
Pre-requisite course code and title (if any): MPE 171					
Department: Department of Policy Studies					
Course coordinator: Dr Kavita Sardana			**Course instructor:** Dr Kavita Sardana		
Contact details: kavita.sardana@terisas.ac.in					
Course type: Core			**Course offered in:** Semester 2		

Course description:
By the end of the semester, the students are expected to be at ease with basic econometric techniques such as setting up a model, testing assumptions and have a critical view on econometric results. Computer classes introduce the student to real life problems and help to understand the theoretical content of the lectures. The course reviews the linear model, ordinary least square regression, hypothesis testing, simultaneity and endogeneity, discrete choice modelling.

Course objectives:
1. To understand classical linear model assumptions, it's violations, and solutions.
2. To learn how research problem relating to continuous random variables is formulated, modelled, and analysed through research projects.

Course contents

Module	Topic	L	T	P
1	Introduction; The Simple Regression Model	2		2
2	Multiple Regression Analysis: Estimation	4		2
3	Multiple Regression Analysis: Inference	4		2
4	Multiple regression analysis: Further issues	4		
5	Heteroskedasticity, Autocorrelation, Multicollinearity.	6		
6	More on specification and data problems	4		
7	Multiple regression analysis with qualitative information: Dummy variables	6		2
8	Limited dependent variable models.	6		2
9	Simultaneous Equations Models	4		2
10	Instrumental variable estimation	4		
11	Introduction to Panel Data	4		
12	Conducting and Understanding Empirical Projects	6		
	Total	**54**	**0**	**12**

Materials:
Suggested readings
- Wooldridge, J.M. (2007): *Introductory Econometrics: A Modern Approach*, Fourth Edition, Thomson South-Western.
- William H Greene (2003) *Econometric Analysis*, Pearson Education,5th edition,

Modules and reading outline
(Following Wooldridge, 2007)
Module 1: Introduction
1. Empirical economic analysis; economic data; causality
2. Source: Chapter 1
The simple regression model
1. Definition; derivation of estimators; properties of estimators; goodness-of-fit; units of measurement (data scaling); functional form; regression through the origin
2. Source: Chapter 2, Chapter 6.1, Chapter 6.2
Module 2: Multiple regression analysis: Estimation
1. Definition and interpretation; properties of estimators; irrelevant variables; omission relevant variable
2. Source: Chapter 3
OLS asymptotics: large sample properties of OLS estimators: consistency; asymptotic normality
1. Source: Chapter 5
Module 3: Multiple regression analysis: Inference
1. Sampling distribution; testing hypotheses about a single population parameter
(one- and two-sided alternatives); confidence intervals; testing hypotheses about a single linear

combination of parameters; testing multiple linear restrictions
2. Source: Chapter 4.

Module 4: Multiple regression analysis: Further issues
1. Models with interaction terms; goodness-of-fit; predictions and residual analysis
2. Source: Chapter 6.2 – Chapter 6.4

Module 5: Heteroskedasticity, Autocorrelation, Multicollinearity
1. Consequences; testing for Heteroskedasticity, Autocorrelation, Multicollinearity and remedial measures
2. Source: Chapter 8 and sections from Chapter 11 and 12

Module 6: More on specification and data problems
1. Functional form misspecification; proxy variables; measurement error; missing data; non-random samples; outliers
2. Source: Chapter 9.

Module 7: Multiple regression analysis with qualitative information: Binary (or dummy) variables
1. qualitative information; a single dummy independent variable; dummy variables for multiple categories; dummy variables' interactions; linear probability model
2. Source: Chapter 7.

Module 8: Limited Dependent Variable Models
1. Logit, Probit and Binary Dependent Variable model
2. Source: Chapter 10.

Module 9: Simultaneous Equations Models
1. Concept of simultaneous equations model. Exogenous and endogenous variables. Predetermined variables.
2. The simultaneous equations bias. Inconsistence of OLS estimators. Structural and reduced forms of the model. Model of demand and supply and simple Keynesian equilibrium model as simultaneous equations models.
3. Identification problem. Rules of identification.
4. Testing exogeneity: Hausman test.
5. Source: Chapter 16

Module 10: Methods of estimation. Indirect Least Squares (ILS).
1. Instrumental Variables. Two-stages Least Squares (TSLS).
2. Source: Chapter 15

Module 11: Introduction to Panel Data
1. Pooling different cross-sections across time; difference-in-difference method; fixed effects and random effects
2. Source: Chapters 13 and 14

Module 12: Conducting and understanding empirical projects
1. Empirical project: framing a question, review of literature, collection of data, empirical analysis, presentation
2. Source: Chapter 19

Software: The course places heavy emphasis on using software to analyze data. Software that one mostly works with is STATA.

Evaluation criteria:		
1. Written exam (Minor 1 and minor 2)	20%	[Modules 1-6]
2. Practical Exams	10%	[Modules 1-11; concurrent with written examinations]
3. Project	20%	[Module 12]
4. Written examination	50%	[Modules 1-11]

Learning outcomes:
After completing this course, students will be able to:
1. Identify modelling problems relating to continuous endogenous/choice variables [Tests 1-3]
2. To solve problems relating to continuous endogenous/choice variables through empirical analysis [Tests 2-4]

Pedagogical Approach:
– Classroom teaching
– Importance of practicals and software applications

Additional Information:
None

Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course reviewers:
1. SubrataSarkar, Professor, Indira Gandhi Institute of Development Research, Mumbai
2. AbhiroopMukhopadhyay, Associate Professor, Economics and Planning Unit, Indian Statistical Institute, New Delhi

Prepared by:
Dr Kavita Sardana