



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2023-2024
Course Handout Part II

Dated: 09/01/2024

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : ECON F241
Course Title : Econometric Methods
Instructor-in-Charge : Bheemeshwar Reddy A

Scope and Objective of the Course:

Economic theories are developed to understand complex economic problems of the real world. Econometrics provides the tools that are required to test abstract economic theories empirically with the help of data. Recent trends in economics research point towards increasing importance of empirical analysis in understanding economic phenomena. Hence, knowledge of econometrics is essential for the students of economics.

The course aims to provide a basic theoretical understanding of linear econometric models. It provides introduction to the classical regression model and its assumptions. The emphasis will be on econometric theory. The course deals with the application of econometric methods and interpretation of results. Further, the course provides basic hands on training in using statistical package R to enable the students to apply econometric models. The course deals with theory and assumptions underlying the classical single and multiple linear regression models.

1. **Textbooks:** Christopher Dougherty (2016) Introduction to Econometrics, 5th Edition, Oxford University Press.

Reference books:

1. **R1) Jeffrey M. Wooldridge** (2013), *Introductory Econometrics: A Modern Approach*, 5th Edition, Thomson, South-Western.
2. **R2) A. H. Studenmund** (2017) *Using Econometrics: A Practical Guide*, 7TH Edition, Pearson
3. **R3) Peter Kennedy** (2008), *A Guide to Econometrics*. Wiley-Blackwell; 6th Edition,
4. **R4) Damodar. N. Gujarati and Sangeetha** (2012), *Basic Econometrics*, 5th Edition



Tata McGraw-Hill Publishing Company Limited,

5. **R5) Damodar. N. Gujarati and Sangeetha** (2012), *Basic Econometrics*, 5th Edition

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Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-2	On completion of the module, students will be able to learn the scope and importance of econometrics and they will also be able to distinguish the differences among different types of economic data. Students will also revise fundamentals of probability, statistical inference, and mathematical statistics that are prerequisite for this course.	The nature and scope of econometrics & review of probability statistics: the scope of econometrics; types of data; review of fundamental concepts in probability such as probability and distribution, expectation and moments, sampling distributions and inference, the Central Limit theorem	Review (TB) & 1 (R3) and additional readings
3-9	Students will learn different theoretical aspects of simple linear regression model and its properties	The Simple Linear Regression Model: Simple regression model, assumptions, deriving the ordinary least square (OLS) estimates, properties of OLS, unbiasedness of OLS, variance of OLS estimators,	Ch.1-2 (TB), Ch. 2-6 (R4) & Ch. 2-4 (R5) and additional



	<p>and the underlying assumptions. Students will also learn derivation of ordinary least squares method of estimates and they will also master concepts such as unbiasedness and consistency of least squares estimates. Students will also learn about hypothesis testing in the context of regression.</p>	<p>estimating error variance, Gauss-Markov theorem, hypothesis testing</p>	<p>readings</p>
10-19	<p>Students will learn advantages of multiple linear regression over simple linear regression. They will also learn derivation of ordinary least squares method of estimates. Students will learn about sampling distribution of OLS estimators and hypothesis testing. They will be equipped to interpret regression results.</p>	<p>Multiple Regression Analysis: Multiple Regression Estimation, Inference & OLS asymptotics</p>	<p>Ch. 3 (TB), Ch. 7-8 (R4) & Ch. 5-6 (R5) additional readings</p>

	Students will learn the meaning and usefulness of consistency, asymptotic normality and asymptotic efficiency of OLS.		
20-21	On completion of this module, students will learn how to deal with independent qualitative variables and learn how to interpret the dummy explanatory variables. Further, they will also learn about what is the meaning of an interaction among dummy variables and how to interpret the same.	Dummy variables: Use of dummy variable, slope of dummy variables, interpretation of dummy regression coefficients, interaction involving dummy independent variables	Chapter 5 (TB) & Ch. 7 (R5) & additional readings
22-32	On completion of the module, students will be familiarized with the concepts related to multicollinearity, consequences of multicollinearity and how to detect	Violation the assumption of classical linear regression model: Multicollinearity; consequences of multicollinearity; tests for detecting the multicollinearity and solutions; prediction; heteroscedasticity and its implications; tests for detection; solutions; prediction; sources of autocorrelation, the first-order autoregressive scheme; tests;	Ch. 7-8 (TB), Ch. 10-12 (R4) & Ch.8 (R1) & Ch.8 in (R5) and additional readings

	<p>multicollinearity with help of different indicators of multicollinearity. They will also learn about the methods to address the problem of multicollinearity. Students will also learn about violation of another assumption of CLRM, heteroscedasticity. They will learn the consequences of heteroscedasticity and how to detect heteroscedasticity with help of different tests such as Park test, Goldfeld-Quandt test etc. Students will also learn the different methods to address heteroscedasticity. Students learn the meaning of autocorrelation, consequences of autocorrelation and how to detect autocorrelation with help of</p>	<p>solutions for the case of autocorrelation</p>	
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	different tests of autocorrelation. They will also learn about the remedial measures to address the problem of autocorrelation.		
33-38	Students will learn about the problems arising due to misspecification of regression model. Specifically, they will learn about the consequences of omitted variable problem. Also they will learn the meaning of measurement error and its consequences.	Model specification and Measurement Errors: Model specification, properties of OLS under measurement error	Ch. 6 (TB), Ch. 13 (R4) & Ch. 9 (R1) additional readings
39-41	In this module the students will be familiarized with qualitative and limited dependent variable models and their applications.	Qualitative and Limited Dependent Variable Models: probit, logit, multinomial logit, tobites	Ch. 16 (R5) and additional readings

Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Nature of
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		(%)		Component
Mid-semester test	90 Minutes	30%	12/03 - 11.00 - 12.30PM	Closed book
Assignments/ Projects		15%	TBA	Open book
Quiz/Viva (2)		15%	TBA	Open book
Comprehensive Examination	180 Minutes	40%	09/05 FN	Closed book

Chamber Consultation Hour: To be announced in class.

Notices: All notices regarding the course will be displayed on the CMS or ECOFIN Dept. notice board.

Make-up Policy: Make-up will be given only on Doctor's/Warden's recommendation and with prior permission of the Instructor-in-Charge/Instructor. Make-up application via sms/messages is not acceptable.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE

