BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION
SECOND SEMESTER 2020-2021

Course Handout (Part II)

18.01.2021

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	**: N.V. M. RAO**
Instructor	**: N V M Rao**

1. Course Description:

Introduction to Regression Analysis - Specification of simple linear regression model, least square method of estimation, classical assumptions, general and confidence approach to hypothesis testing. Specification of Models; estimation of single equation economic models and related problems; Auto -correlation, multicollinearity and heteroscedasticity, Multiple regression analysis; regression using dummy variables; simultaneous equation models.

2. Scope and Objective of the Course:

The purpose of this course is to introduce students to the econometric theory and methods. It covers the basic tools of estimation and inference in the context of the single-equation linear regression model, and deals primarily with least squares methods of estimation. The course emphasizes the intuitive understanding and practical application of these basic tools of regression analysis, as distinct from their formal theoretical development. Topics include simple and multiple linear regression analysis, correlation, and hypothesis testing. Both conceptual and practical problems are considered, including multicollinearity, dummy variables, heteroscedasticity, autocorrelation, specification and measurement errors. Some emphasis will also be placed on models using time series data, panel data and simultaneous equation estimation. Course material is presented predominantly in scalar terms; the use of matrix algebra is confined to summarizing major results and to interpreting output listings of computer software programs. The course is designed to build a solid base of theoretical understanding, and exercise this theory with economic applications, providing a base of practical knowledge.

3. Learning Outcomes

Knowledge outcomes

- The basic econometric techniques and their applications and equip them with a broad knowledge of regression analysis relevant for analyzing economic data.
- To interpret and critically evaluate the outcomes of empirical analysis by using standard methods like properties of least squares estimators and the statistical testing of hypothesis.
- Postulation and testing of hypotheses pertaining to economic issues or problems.
- To derive and analyze the properties of estimators, test statistics and compare their performance
- Basic procedures for model validation.

Skills

- Become a critical reader of the literature concerning empirical analyses and become a qualified user of econometric methods
- To be able to use a computer based program package for performing different types of econometric analyses
- To perform different statistical tests and carry out regression analyses of empirical data in computer software.

Competencies

- To be able to read and understand project reports and journal articles that make use of the concepts and methods which will be introduced during the semester under this course
- To be able to make use of basic econometric models in any kind of academic work

4. Text Book:

Christopher Dougherty**, Introduction to Econometrics**, Oxford, Fourth Edition, Indian Edition, 2011.

Reference Books:

R1. Johnston J and John Dinardo, Econometric Methods, McGraw-Hill International, MGHISE, 4th Edition, 1997
R2. Damodar. N. Gujarati and Sangeetha, Basic Econometrics, Tata McGraw-Hill Publishing Company Limited, Fourth Edition, 2007
R3. R. S. Pindyck and D.L. Rubinfeld , Econometric Models and Economic Forecasts, Third Edition, McGraw-Hill: New York, 1991
R4. H. Baltagi Badi, Econometrics, Springer, Delhi, Second Edition, 1999
R5. Ramu Ramanathan, Introductory Econometrics With Applications, Thomson South-Western, Fifth Edition, 2002
R6. Wonnacott & Wonnacott, Econometrics, Wiley, New York, 1970.

5. Course Plan:

Lecture No.	Learning Objective(s)	Topics to be Covered	Reference to Text Book	Learning Outcome(s)
1	The Nature and Scope of Econometrics	Introduction		
2-3	Review of Statistics	Random variables, Sampling, and Estimation	Review	
4-9	The Simple Linear Regression Analysis	Simple Linear Model Assumptions; Derivation and Interpretation of Regression Coefficients; The Correlation Coefficient; Goodness of Fit	Ch 1	be able to understand the fundamental techniques and assumptions involving linear regression estimation; interpretation of coefficients in the context of specific regression models; construct appropriate regression specifications, extensions of simple regressions
10-14	Properties of Regression Coefficients Hypothesis Testing	Types of Data and Regression Model; Properties of Regression Coefficients Gauss-Markov Theorem; F-test	Ch. 2	
15-18	Multiple Regression Analysis	Extension of two variable model; Derivation and Interpretation of the multiple regression coefficients; Properties of the multiple regression coefficients;	Ch. 3	
19-21	Multicollinearity	Multicollinearity; Consequences of Multicollinearity; Tests for Detecting the Multicollinearity and Solutions;	Ch.3 and **Class Notes**	Identifying and correcting (if possible) the problems arising due to multicollinearity;
22-25	Non Linear Models and Transformation of Variables	Basic Procedure; Logarithmic Transformation; Nonlinear Regression; Comparison Linear and Logarithmic Specification	Ch.4	Understand the transformation of variables and nonlinear models
26-28	Dummy variables	Use of Dummy Variable, Slope Dummy Variable; The Chow Test	Ch.5	Introduction of binary variables into regression
29-31	Specification of Regression Variables	Model Specification; Exclusion of Relevant and inclusion of irrelevant variable; Proxy Variables; Testing of Linear Restriction	Ch.6	Understand the specification of regression variables and model
32-34	Heteroscedasticity	Heteroscedasticity and its Implications; Tests for Detection; Solutions; Prediction	Ch.7 and **Class Notes**	Identifying and correcting (if possible) the problem of heteroscedasticity and autocorrelation
35-37	Autocorrelation	Sources of Autocorrelation, The First-order Autoregressive Scheme; Tests; Solutions for the Case of Autocorrelation; Prediction	Ch 12 and **Class Notes**	
38-40	Simultaneous Equation Estimation - Introduction	Introduction to Simultaneous Equation Models; Simultaneous Dependence of variables and Consequences; Simultaneous Bias; The Problem of Identification;	Ch.9 and **Class Notes**	Understand the basics of simultaneous equation estimation models of econometrics.
41	Conclusion	Review of Course Completed	---	----

6. Evaluation Schedule:

S.No.	Evaluation Component	Duration	Weightage (%)	Date & Time -- Venue	Nature of Evaluation
1	MIDSEM TEST	90 min	30		Closed Book
2	CLASS TESTS / QUIZZES /	15 min each	15	---	Closed Book
3	TUTORIALS ASSIGNMENTS / CLASS PARTICIPATION	-	15	Monday 10 hr Will be announced in the class	Closed Book
4	COMPREHENSIVE EXAMINATION	120 min	40	13/05 FN	Partly Open Book

7. Chamber consultation hour: Thursday 4.00pm-5.00pm

8. Notices: All notices regarding the course would be sent to student course mail group.

9. **Make-up Policy:** Make-up exam for Mid Semester Test and Comprehensive Examination may be given only on genuine grounds; prior permission of I/C is required to get a makeup test.

10. Other Course Policy Issues:

- E-mail address for this course related information: **nvmraoeconometrics@gmail.com**

- Students are expected to attend class and to arrive on time and prepared. You should read the sections in the textbook we are going to cover in class prior to following the lecture.
- Assignment/Problem Sheets and Reading Assignments will be assigned periodically. They must be worked out to understand the subject. For Reading Assignments, students are expected to consult the books, Research Articles, notes and Reports as advised in the classroom.
- If there are problems of any nature that concern the class of which I am unaware of and which need to be addressed, please feel free to discuss this with me at any time. The main objective is to foster an environment where people who are interested in the subject matter have the opportunity to discuss their questions in a positive learning environment.
- Use of mobile phones/electronic devices is not allowed during the class hour.

The instructor reserves the right to make adjustments to this syllabus. Any change will be notified at least one week in advance. But it is your responsibility to stay informed if you do not attend all the classes.

Instructor-in-charge
ECON F241