BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR 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 timetable) this portion gives further specific details regarding the course

Course No. : **ECON F342**
Course Title : **APPLIED ECONOMETRICS**
Instructor-in-Charge : **N.V. MURALIDHAR RAO**
Instructor(s) :
Tutorial/Practical Instructors : **N V M Rao**

1. Course Description:

This course provides an introduction to advanced estimation and econometric techniques of analysis, with particular emphasis on how these techniques can be used for the empirical testing of economic theories and/or policy prescriptions. Topics to be studied include specification, estimation, and inference in the context of models that include then extend beyond the standard linear multiple regression frameworks.

Multiple regression analysis; analysis of generalized linear and nonlinear models; instrumental variables; maximum likelihood, generalized method of moments (GMM), and two step estimation methods; simultaneous equation models; time series processes; identification and estimation of time series models; techniques for assessing model fit; forecasting; time series analysis and models of expectations; univariate time series analysis, stationary vs. non-stationary series; ARIMA, GARCH, VAR, co-integration, granger causality, error correction and limited dependent variable models; auto regressive distributed lagged variable models multivariate time series analysis; dynamic models; analysis of panel data, balanced and unbalanced panel data, mixed, fixed and random effect models.

2. Scope and objective of the course:

This is a course in applied econometrics, emphasizing the implementation of econometric techniques to analyze concrete economic problems, using data and econometric software. Though not a theoretical course, we will introduce some basic theory and concepts to motivate an appropriate use of econometric methods.

Specific Objectives:

- To explain the theory behind estimating econometric methods and provide an analytical and quantitative background in the fundamentals of econometric analysis.
- To give students opportunities to use econometric models and methods in analysis and problem solving. Students will learn how to choose the adequate method, discuss its identifying assumptions, correctly interpret its results and to translate them into economically meaningful answers

The course uses the fundamental concepts of econometric methods and applies them to data to build, estimate and interpret their own econometric models for concrete economic and financial problems.

3. Text Book (TB):

Introductory Econometrics- A Modern Approach by J Wooldridge, 5th Edition (ISBN No. 9788131516737), South Western Cengage Learning

4. References

R1. Ramu Ramanathan, *Introductory Econometrics with Applications*, Fifth Edition, S-W Cengage Learning, Indian Edition 2008
R2. James H. Stock and Mark W. Watson, Introduction to Econometrics, Second Edition, Pearson Addison-Wesley, 2007
R3. Greene, W., Econometric Analysis, 7th Edition, Prentice Hall, 2011
R4. Jack Johnston and John Dinardo, *Econometric Methods*, Fourth Edition, McGraw-Hill, 1997.
R5. Intriligator, Bodkin and Hsiao, *Econometric Models, Techniques, and Applications*, Second Edition, Prentice Hall, 1996.
R6. G.S. Maddala, *Introduction to Econometrics*, Second Edition, MacMillan, 1992
R7. Judge et al., *The Theory and Practice of Econometrics*, Second Edition, Wiley, 1994
R8. Damodar. N. Gujarati and Sangeetha, Basic Econometrics, Fourth Edition, Tata McGraw-Hill Publishing Company Limited, 2007
R9. R. S. Pindyck and D.L. Rubinfeld , Econometric Models and Economic Forecasts, Third Edition, McGraw-Hill: New York, 1991
R10. H. Baltagi Badi, Econometrics, Springer, Delhi, Second Edition, 1999
R11. H. Theil, Econometrics, Wiley, New York, 1968.
R12. A. S. Goldberger, Econometric Theory, Wiley, New York, 1964.
R13. "Econometric Applications in India", Edited by K L Krishna, Oxford, New Delhi, 1997.

5. Course Plan:

Module No.	Learning Objectives	Lecture Session	Reference (Book)	Learning Outcome (s) (on successful completion of this part, student will be able to:
1	Applied Econometrics - Overview of the course.	Introduction: Scope and Coverage	Ch.1	
2-4	Review of important Concepts	Simple and multiple regressions: Chapters 1, 2, and 3 (skim) Dummy variables; Heteroskedasticity	Ch. 1, 2, 3 (Skim) Ch. 4, 7, 8 (Skim)	Understands and expresses the core underlying econometric model principals
		Other Important Concepts will be reviewed from time to time.		
Analysis with Cross Section Data				
5-7	Specification and Data Issues	Functional form Misspecification, Specification and Data Problems	Ch. 9 and Class Notes	Demonstrate an understanding of modeling nonlinear regressions, misspecification and data issues
8		**Class Exercises & Discussion**	**Class Notes**	
Regression Analysis with Time Series Data				
9-11	Basic Time Series Regression Models	Time series Data and Time Series Regression Models; Finite Sample Properties of OLS Functional Form, Dummy Variables and Index Numbers Trends and Seasonality	Ch 10	Perform basic econometric analysis for time series data; Serial Correlation and Heteroscedasticity in Time Series
12-15	Further Issues in Using OLS	Stationarity and Weakly Dependent Time Series Highly Persistent Time Series Dynamically Complete Model Homoskedasticity Assumption for Time Series Models	Ch 11	Identify and estimate autoregressive integrated moving average (ARIMA) models and obtain forecasts of economic variables.
16-17	Serial Correlation and Heteroscedasticity in Time Series	Serial Correlation and Heteroscedasticity in Time Series; Testing and Corrections; OLS and FGLS	Ch 12	
18-21	Time Series Models	Stationary vs. Non-stationary Series, ARIMA, GARCH, VAR, Co-integration, Granger causality; Error Correction Models	Class Notes	

22		**Class Exercise & Discussion**	**Class Notes**	
23-26	Advanced Time Series Concepts	Infinite Distributed Lag Models, Testing Unit Roots, Spurious Regressions, VAR, Co-integration, Granger causality; Error Correction Models, Forecasting	Ch. 18	Understands the distributed lag models; VAR and cointegration, error correction models
27		**Class Exercise & Discussion**	**Class Notes**	
Other Topics:				
28-30	Pooling Cross Section and Time Series Data	Panel Data Methods Difference-in-Differences estimator; First Difference Estimator; Fixed effects and random effects estimators; Individual Effects and Fixed Effects Models; Balanced and Unbalance Panel Data;	Ch 13 and 14	Construct, estimate and understands econometric models with panel data methods
31		**Class Exercise & Discussion**	**Class Notes**	
32-34	Instrumental Variables (IV) Estimation and Two Stage Least Squares	Endogenous regressors, simultaneity, and Instrumental Variables; Two Stage Least Squares	Ch.15	Estimate and test models using instrumental variables and two stage least squares;
35		**Class Exercise & Discussion**	**Class Notes**	
36-38	Simultaneous Equations Models	Simultaneous Equations Models, Problems of identification and estimation, Simultaneity Bias, Simultaneous Equations Models with Time Series and Panel Data	Ch .16	Confidently discuss the problem of identification, simultaneity bias; and simultaneous equation models related time series and panel data
39-40	Limited Dependent Variable Models	Binary dependent and Linear Probability Model; Probit and Logit Models; Count and Censor Data	Ch. 17	Construct, estimate and test econometric models with limited dependent variables; logit and probit models
	Conclusion	**Overall Review of the Course**	**-**	

6. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
1	Mid Semester Test	90 min	30		Closed Book
2	Tutorial/ Class Tests /Quizzes/Class Participation	15 min each	25	Tutorial: THURSDAY -9 hr To be announced in the class	Closed Book/ Open Book
3	Course Empirical Project	-	10	To be announced in the class	Closed Book
4	Comprehensive Examination	120 min	35	10/5 FN	Partly Open Book

7. Chamber Consultation hours: **Wednesday 4.00-5.00 pm**

8. Notices: Notices would be sent to students through course mail id. It will be also communicated through student group coordinator.

9. Make-up: Make-up may be given only on genuine grounds. Prior permission has to be obtained.

10. Other Course Policy Issues:

- E-mail address for this course related information: **nvmappliedeconometrics@gmail.com**.
- ***Course Class Coverage and details of specific topics from the chapter will be announced in the class from time to time.***
- Assignment/Problem Sheets and Reading Assignments will be assigned periodically. For Reading Assignments, students are expected to consult the books or specific course handout notes as advised in the classroom.
- The Empirical Project is a group project in which students form teams of three (3) members and work on a practical empirical topic using modern econometric techniques. Further information and material on the empirical project will be made available as the course proceeds. You are expected to collect and analyze a data set using the econometric methods.
- ***No makeup examination will be given for class tests and quizzes.*** **Class Participation is a must.**
- 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.
- 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*.

The instructor in charge 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 F342