INTRODUCTION TO ECONOMETRICS

PROF. SABUJ KUMAR MANDAL
Department of Humanities and Social Sciences
IIT Madras

TYPE OF COURSE : Rerun | Elective | UG
COURSE DURATION : 12 Weeks (24 Jan'22 - 15 Apr'22)
EXAM DATE : 23 Apr 2022

PRE-REQUISITES : Inferential statistics
INTENDED AUDIENCE : Anyone interested in data analysis
INDUSTRIES APPLICABLE TO : Banking, Analytics, Audit firms

COURSE OUTLINE:
As the name suggests, the subject econometrics aims to measure economic relationship. Using economic data and applying mathematical and statistical tools, it provides empirical validity of abstract economic theory. However, application of econometrics is not confined in the domain of economics, rather widespread application of econometrics is possible in other social science and pure science domains also. After successful completion of the course, students would be able to formulate econometric model to analyze data and then would be able to establish any cause-effect relationship in their preferred areas of interest like economics, finance, management, engineering and science. An expertise in econometrics increases the job prospect of the students significantly.

ABOUT INSTRUCTOR:
Prof. Sabuj Kumar Mandal is currently working as an Assistant Professor in the Department of Humanities and Social Sciences, Indian Institute of Technology Madras (IITM), Chennai. He completed his B.Sc (Economics) from the Scottish Church College Kolkata (1999-2002) and M.Sc (Economics) from the University of Calcutta with a specialization in Econometrics. He completed his doctoral degree in economics from the Institute for Social and Economic Change, Bangalore.

COURSE PLAN:

Week 1: Introduction to Econometrics and Econometric Analysis, Steps involved in Econometric Analysis
Week 2: Introduction to Classical Linear Regression Model- Two variable classical linear regression model, Assumptions of Classical Linear Regression Model
Week 3: Classical Linear Regression Model assumptions, Estimation of the regression model, Properties of Ordinary Least Square estimators
Week 4: Regression analysis: Objective, Statistical Analysis and Interpretation of results, Hypothesis testing-Types of Hypothesis, Test statistic, Critical Region
Week 5: Hypothesis testing: Level of significance and confidence interval approach; Goodness of Fit(R^2): Concepts of Explained Sum of Squares (ESS)-Residual Sum of Squares -Total Sum of Squares
Week 6: Multiple Linear Regression Model: Interpretation of the model,Statistical Analysis, Interpretation of the results
Week 7: Model misspecification: R^2 vs Adjusted R^2 ; F statistics-Application of F statistics-Overall significance of the model-Equality between two regression coefficients-Testing the validity of linear restricted and Unrestricted models
Week 8: Application of F statistics: Testing structural break in Time Series data- Chow test, Limitations of chow test; Dummy Variable models: Introduction, Different types- ANOVA, ANCOVA
Week 9: Dummy variable models continued, Application of Difference-In-Difference for impact evaluation, Statistical Analysis of the Dummy variable models
Week 10: Dummy variable model for testing seasonal fluctuation: Introduction, Analysis, Dummy variable trap; Relaxing the assumptions of Classical Linear Regression Model: Multicollinearity-Introduction-Consequences-Detection-Remedial measures; Autocorrelation-Introduction-Consequences-Detection-Remedial measures
Week 11: Heteroskedasticity: Introduction- Consequences-Detection-Remedial measures; Qualitative Response Models: Linear Probability Model,Logit Model
Week 12: Qualitative Response Models: Probit model, Alternative measures of Goodness of Fit (R^2) in Qualitative response models, Logit vs Probit model selection, Limited dependent variable model/ Tobit Model