INTRODUCTION TO ECONOMETRICS

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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. His teaching and research interests include Applied Econometrics, Energy and Environmental Economics (efficiency analysis), Adaptation to Climate Change, Environmental regulation and Firm Performance and Behavioral & Experimental Economics. He has several national and international publications in his credit. He was awarded Young Economist Award 2015 by the Indian Econometric Society for his contribution to quantitative economics. Recently, he has been awarded Fulbright Nehru Academic and Professional Excellence Award 2020-21 (research category) for conducting research in the area of ‚ÄòCommunity Based Adaptation to Climate Change‚Äô taking Southeast Florida Regional Climate Change Compact (SFRCC) as a model for analysis. He aims to develop an economic framework based on rational choice theory, to identify the motivating factors that determine private participation in community based adaptation (CBA) focusing on individuals‚Äô perception about climate risk, time preference and their adaptive capacity

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