

## Course Title: INTRODUCTORY ECONOMETRIC

Integrated Economics, Semester: IV

Code: IGECON-C403

Credits: 06

*Economics Core Course = 10*

### Course Description

This course provides a comprehensive introduction to basic econometric concepts and techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models. The course also covers the consequences of and tests for misspecification of regression models.

### Course Outline

#### **UNIT I: Nature and Scope of Econometrics**

Definition, Nature and Scope of Econometrics; Need for Econometrics as a separate discipline- Econometrics versus Mathematical Economics and Statistics; Methodology of Econometrics.

Statistical pre-requisites: Data, Nature of Economic data- cross sectional, time series and Panel data.

#### **UNIT II: Simple Linear Regression Model- Two Variable Case**

Statistical and deterministic relationships, Regression versus Correlation; Regression and Causation, SRF and PRF; Stochastic specification of PRF; OLS as a method for minimising stochastic disturbance term.

Classical Linear Regression Model (CLRM) and its assumptions; properties of least square estimators, Gauss-Markov Theorem;  $R^2$  as a measure of goodness of fit.

#### **UNIT III: Multiple Linear Regression Model**

Three variable regression model, interpretation of multiple regression equation, meaning of partial regression coefficients, Multiple coefficient of determination and Multiple correlation coefficient.

Need for dummy variables in regression, Use of dummy variables in regression model for measuring seasonal and interaction effects.

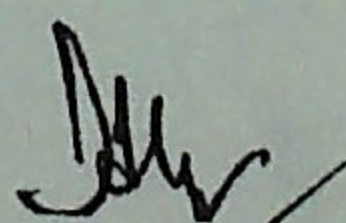
#### **UNIT IV: Violation of Classical Assumptions**

Nature and consequences of Multicollinearity, Detection-Auxiliary regression, Tolerance and VIF, Remedies- Dropping a variable, Data pooling.

Nature of Heteroscedasticity, OLS estimation in presence of heteroscedasticity; formal and informal methods of detection; Method of Weighted least squares as a remedial measure.

Autocorrelation and BLUE estimators; Detection- Durbin Watson d test, B-G test, Use of Quasi difference equation as a remedial measure.

Model specification errors- omitting/inclusion of a relevant/irrelevant variable(s).





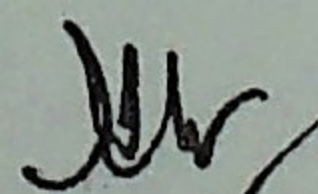
## Readings

1. Jay L. Devore, Probability and Statistics for Engineers, Cengage Learning, 2010.
2. John E. Freund, Mathematical Statistics, Prentice Hall, 1992.
3. Richard J. Larsen and Morris L. Marx, An Introduction to Mathematical Statistics and its Applications, Prentice Hall, 2011.
4. D. N. Gujarati and D.C. Porter, Essentials of Econometrics, McGraw Hill, 4<sup>th</sup> edition, International Edition, 2009.
5. Christopher Dougherty, Introduction to Econometrics, Oxford University Press, 3<sup>rd</sup> edition, Indian edition, 2007.
6. Koutsoyiannis A. (2004), Theory of Econometrics, Second edition, Palgrave.
7. Seddighi H.R (2012), Introductory Econometrics- A practical Approach, Routledge.
8. Gujarati D.N and Porter D.C (2009), Basic Econometrics, 5<sup>th</sup> Edition, McGraw Hill Irwin.
9. Gujarati D.N (2012), Econometrics by Example, 2<sup>nd</sup> Edition, Palgrave Macmillan.

## PRACTICALS/ LAB WORK

### List of Practicals

- 1: Divide your class in two groups (male/ female) and after collecting the actual data
  - a) Plot it and check for normality
  - b) Test the hypothesis-there is no significant difference between average weights of two groups.
3. Collect data for average transport expenditure per month and distance travelled from home to college for a minimum of 100 students. Plot the same to examine the extent of correlation. Using the same data find numerical value for karl pearson's coefficient of correlation.
2. Collect data ( Cross sectional) for GSDP of Indian states in previous financial year and plot the same using MS Excell/ SPSS. Collect data (time series) for imports and exports in India during post reform period. Plot the same using different options in MS excel and make a comparison of two variables using various options.
4. After collecting actual data for different variables from your batchmates run a regression of the form  
Marks in micro economics =F( marks in mathematical economics, marks at 12<sup>th</sup> standard, number of schooling years of father) and note the results.  
Now incorporate a gender dummy as independent variable. Run the regression again and interpret the results.





5. Using the socio economic variables for which data collection is feasible create a

a) long panel      b) short panel

6. Collect data for a) US defence expenditure (DE) and b) Population of India (PI)

Make use of any software (Ms Excell/ SPSS/ E Views/ STATA) to compute correlation coefficient and Regression coefficient of DE on PI to explain the problems of Spurious correlation and Spurious Regression.

7. Using the data on number deaths from lung cancer and number of cigarettes smoked per capita for US states (data available at [www.palgrave.com/economics/gujrati](http://www.palgrave.com/economics/gujrati).) explain the method of outlier detection using plot of residual and squared residual.

8. Demonstrate the use of graphic method to detect problem of Autocorrelation using any hypothetical example.

9. Using any hypothetical example( s) show the advantages of dummy variable approach over direct use of Chow test.

