Semester 4

Programme	:	**Master of Commerce [M.Com]**
Course Code	:	**COM-603**
Course Title	:	**Advanced Econometrics**
Number of Credits	:	**4**
Effective from AY	:	**2022 – 2023**

Pre-requisites for the Course:
NIL
Objectives of the Course:
1. To enable learners to apply cross-section regression models on limited dependent variables. 2. To enable learners to acquire time series modeling and forecasting skills with advanced analytical techniques for short-term and long-term relationships in variables of interest. 3. To enhance skills in estimation and forecasting of volatility. 4. To provide skills in building panel data models for examining dependency relationships amongst financial variables.

Course Content		
Unit 1	**Limited Dependent Variable Models**	**15 Hours**
Nature – Linear Probability Model – Limitations of LPM – Logit and Probit Models: Structure and specifications, Estimation, Interpretations, Computing marginal effects – Tobit Model: estimations and specification issues.		
Unit 2	**Multivariate Time Series Analysis**	**15 Hours**
Vector autoregressive (VAR) models – Estimation and forecasting with VAR – Forecast error variance decomposition - Impulse response function – Generalized VAR - Forecasting with VAR models - Granger causality test – VAR based Granger causality test – Johansen Co-integration test – VECM model – ARDL model.		
Unit 3	**Advanced Volatility Models**	**15 Hours**
Multivariate GARCH and conditional correlations models – Constant and Dynamic Conditional Correlations models – BEKK GARCH model – Stochastic volatility models: Concept, structure, Kalman filter.		
Unit 4	**Panel Data Econometrics**	**15 Hours**
Panel data structure – Advantages of Panel Data –Pooled OLS Regression – Fixed Effects model – Random effects model – Properties of Various Estimators - Fixed Effects versus Random effects model – Wald test - Breush and Pagan Lagrange Multiplier Test – Hausman Test – Non-Stationary Panel - Panel unit root and cointegration tests.		

Pedagogy:
Lectures / case analysis / assignments / classroom interaction / lab. Practical problems may be solved using available open source software.
Reference / Readings:
1. Asteriou Dimitrious, ***Applied Econometrics***, Palgrave Macmillan, New York, 4th edition, 28th May 2021. 2. Cameroon Samuel, ***Econometrics***, McGraw Hill, New York, 2005. 3. Davidson, J, ***Econometric Theory***, Blackwell, USA, 1st edition, 7th April 2000.

4. Fabozzi, F., Focardi, S., Rachev, S. and Arshanapalli, B. ***The Basics of Financial Econometrics: Tools, Concepts and Asset Management***, Wiley, 7th March 2014.
5. Goldberger, A.S. ***Introductory Econometrics***, Harvard University Press, Cambridge, 1998.
6. Greene, W. ***Econometric Analysis***, Prentice Hall, New York, 5th edition.
7. Guidolin, M. and Pedio, M. ***Essentials of Time Series for Financial Applications***, Academic Press, UK, May 2018.
8. Gujarati, D. ***Basic Econometrics***, McGraw Hill, New Delhi, 5th edition, 1st July 2017.
9. Hayashi, F, ***Econometrics***, Princeton University Press, Princeton, 19th November 2000.
10. Pattreson, Kerry, ***An Introduction to Applied Econometric: Time Series Approach***, Palgrave Macmillan, New York, 2000th edition, 29th June 2000.

Online Resources:

1. https://www.youtube.com/user/econometricsacademy
2. https://www.youtube.com/user/patobi1
3. https://sites.google.com/site/econometricsacademy/home
4. https://www.economicsnetwork.ac.uk/teaching/Online%20Text%20and%20Notes/Econometrics
5. https://www.ssc.wisc.edu/~bhansen/econometrics/Econometrics.pdf
6. https://otexts.com/fpp2/arima.html
7. https://online.stat.psu.edu/stat510/

Course Outcomes:

Upon completion of the course, learners will be able to:

COO1: Apply probability-based models, including LPM, logit, and probit models, to data in social sciences.

COO2: Perform forecasting by developing VAR models.

COO3: Estimate Granger causality models, including the VAR framework.

COO4: Develop models for examining the long-run relationship between financial variables using Johansen's cointegration and ARDL models.

COO5: Forecast financial market volatility using advanced GARCH volatility models and Kalman filter.

COO6: Demonstrate ability to develop useful panel data models with appropriate diagnostic procedures.