Refresher Course on Research Methodology Using Time Series and Panel Data Analysis

3rd -15th February, 2025

Organised By

Malaviya Mission Teacher Training Centre (MMTTC)

Shri Mata Vaishno Devi University

Kakryal, Katra-182 320

Jammu and Kashmir, India

ABOUT THE REFRESHER COURSE

Research methodology is the process of using specific techniques to collect, analyze, and interpret information about a research topic. It's a systematic approach that helps researchers achieve their objectives and understand a phenomenon . Models play an important role in both empirical and applied research. A model is a simplified representation of an actual phenomenon, actual system or a process. The actual phenomenon is represented by the model in order to explain it, to predict it, and to control it. Modeling, an art of model building, is an integral part of most sciences, whether physical or social, because the real-world systems under consideration typically are enormously complex.

Econometrics, defined as the branch of economics concerned with the empirical estimation of economic relationships has been found to be helpful in model building. Models, together with data, represent the basic ingredients of any econometric study. Typically, the theory of the phenomena under investigation is developed into a model which is further refined into an econometric model. This model is then estimated using econometric techniques on the basis of data pertaining to the phenomena under investigation. The estimated model can then be used for various purposes, including structural analysis, forecasting, and policy evaluation.

Econometrics was developed by Jan Tinbergen and Ragnar Frisch (Nobel Laureates (Economics) for quantitative analysis of theoretical inter-relations between economic variables. Econometrics is now taught in social sciences for both teaching and research. Its use in research is all pervasive. The reason is that modern academic and corporate research necessitates quantification of inter-relations between the variables of investigation. Econometrics takes economic models and tests them through statistical trials. The results are then compared and contrasted against real-life examples.

Econometric Modeling provides new and stimulating introduction to econometrics, focusing on modeling. The key issue confronting empirical economics is establishing sustainable relationships that are both supported by data and interpretable from economic theory. Econometric models are elegant, capture the interaction among different factors and can be mimicked to explain complex phenomena in nature and computing. Econometric modeling in research not only enhances value of output of research, but, it also confers prestige and distinction on researchers.

Econometric models are either linear or non-linear. Early econometric models and many current econometric models are linear in that they can be expressed as models that are linear in the parameters. This linearity assumption has been an important one for proving mathematical and statistical theorems concerning econometric models, for estimating parameters, and for using the estimated models for structural analysis, forecasting, and policy evaluation. Non-linear models, that is, econometric models that are non-linear in the parameters, have become more common in recent years largely due to advances in computer software and numerical analysis that have facilitated the estimation of such models. The parameters of a non-linear model are frequently estimated using successive linear approximations of the model, and the properties of such estimators can be derived asymptotically or approximately. While these properties are valid for large samples, the exact small sample properties of estimators for general nonlinear econometric models are unknown. Furthermore, some of the properties have been shown to hold only under the assumption of normally distributed stochastic disturbances, and the consequences of model specification are generally not known in the non-linear case.

OBJECTIVE OF THE REFRESHER COURSE

This refresher course is designed to impart knowledge on Research Methodology with focus on Econometric Modeling and its Applications in the context of empirical research. The objective of this refresher course is to cover important econometric models and methods for research application. This refresher course is intended to introduce participants to the analytical framework of econometrics, the branch of economics that deals with the estimation and evaluation of theoretical issues through econometric models. The refresher course aims to cover a wide range of econometrics topics, so that the tools that participants will learn in this series of lectures will allow them to obtain a deeper understanding of how to analyze economic and financial data and how to derive policy conclusions through the use of different models.

The proposed refresher course will not only equip participants with econometric methods and models of data analysis, but it shall also delineate the road map for the application of these models research data.

TOPICS AND SUBTOPICS

1. **Introduction to Econometrics**
2. **Univariate Analysis & Bivariate Modeling**
3. **OLS Model & Violations of OLS Model Assumptions**
4. **Simple and Multiple Regression Modeling**
5. **Specification Error and Model Selection**
6. **Dummy Variable Model**
7. **Limited Dependent Variable Models:LPM, Logit, Probit and Tobit**
8. **Times Series Stationarity Tests**
9. **Cointegration, ECM Model and Granger Causality**
10. **Time Series Forecasting Model: ARIMA & VAR**
11. **Time Series Volatility Model: ARCH , GARCH and its Advanced Models**
12. **Panel Unit Root tests**
13. **Panel Data Regression Model: Fixed Effect Approach and Random Effect Approach**
14. **Panel Cointegration Test**
15. **Panel Granger Causality Test**
16. **Panel Auto Regressive Distributed Lag (ARDL) Model**
17. **Panel Non-Linear Auto Regressive Distributed Lag (NARDL)**
18. **Panel Generalized Method of Moments (GMM)**
19. **Panel Quantile Regression Model**
20. **Dynamic Panel Data Models**

SOFTWARE APPLICATIONS

Software like R , STATA and E-views will be used in modelling for time series and panel data. This workshop will be dedicated to both theoretical understanding and practical applications of quantitative econometric tools with the help of software like E-Views, STATA, and R software.

TARGET PARTICIPANTS

The targeted participants include Teachers in Central Universities, State Universities, Deemed to be Universities, Private Universities, Institutions of National Importance, Colleges and other Higher Education Institutions. However, priority shall be given to faculty from Economics/ Business/Commerce /Mathematics/ Computer Science faculty, respectively.

NUMBER OF PARTICIPANTS

A total of 40-50 participants will be shortlisted for this program. The committee will select the participants based on their research topics and Curriculum Vitae. The committee's decision on the selection of the participants and count is final and binding. **Permission/Nomination/No Objection letter on institute letter pad duly signed by respective competent authority must be submitted at the time of registration or latest by 1st Febuary, 2025** to become eligible for receiving refresher course certificate.

PEDAGOGY:

The sessions of this refresher course shall be conducted by a team of academicians from IITs, IIMs, NITs, Central Universities, State Universities, and Other Institutions of repute. It will consist of a series of lectures and hands-on practical sessions.

DURATION:

The refresher course is a 12-day (Two Weeks) program scheduled for the 3rd-15th of February 2025. It will be conducted in four sessions from 10.00 AM to 5.00 PM daily. No participants will be provided any travel allowance in attending the refresher course. The travel costs are necessarily self-financing. On first-cum and first-serve basis, the participants will also be provided food and lodging facilities on a double-sharing basis in the University guest house.

HOW TO APPLY

Interested faculty members are requested to send his/her mail with a recent CV to the link below before 1st February, 2025 .

Click to apply: - https://forms.gle/uAbtsYLhA51Cp51h6

REGISTRATION FEE:

No Registration fee for attending this refresher course

CERTIFICATE

The participants will be provided with certificates on successful completion of the programme. **Attendance is must** in all sessions. The decision of the committee is final in this regard.

ORGANISING COMMITTEE

Prof. Pragati Kumar, Hon'ble Vice Chancellor, SMVD University	**Patron**
Prof. Supran Kumar Sharma, Professor, SoB	**Director, MMTTC**
Dr. Pabitra Kumar Jena, Associate Professor, SoE	**Coordinator**
Dr. Arif Billah Dar, Associate Professor, SoE	**Co-Coordinator**
Dr. R. Gopinathan Assistant Professor, SoE	**Co-Coordinator**
Dr. Rajesh Kumar, Assistant Professor, SoE	**Co-Coordinator**

Team Members of Malaviya Mission Teacher Training Centre (MMTTC) at SMVDU

S.No.	Name	Designation	Department	Role
I	Dr. Supran K Sharma	Professor	School of Business	Director
II	Dr. Sharda M. Potukuchi	Professor	School of Biotechnology	Deputy Director
III	Dr. Raghavendra K. Mishra	Professor	School of Mechanical Engineering	Co-Coordinator
IV	Dr. Ankush Anand	Professor	School of Mechanical Engineering	Co-Coordinator
V	Dr. Sunanda	Assistant Professor	School of Computer Science & Engineering	Co-Coordinator
VI	Dr. Surender Singh	Associate Professor	School of Mathematics	Member
VII	Dr. Anil K. Bharadwaj	Associate Professor	School of Electronics & Communication Engineering	Member
VIII	Dr. Kamaldeep	Assistant Professor	School of Electrical Engineering	Member
IX	Dr. Pabitra Kumar Jena	Associate Professor	School of Economics	Member