(162-SCI-17-02) - STATISTICS - ECONOMETRICS AND MATHEMATICAL ECONOMICS

Significance of the Program

Statistics, Econometrics and Mathematical Economics are two important branches of economics that play a crucial role in understanding and analysing economic phenomena. It contributes to the scientific rigor of economics by providing tools for hypothesis testing, model building, and empirical analysis. Mathematical tools such as calculus and optimization techniques are used to analyse decision-making processes, helping economists understand how individuals, firms, and governments make choices in resource allocation. This helps policymakers make informed decisions by predicting the likely outcomes of different policy choices. Econometrics allows researchers to study causal relationships between economic variables by controlling for other factors. Econometric models are used for forecasting future economic trends and outcomes. This is valuable for businesses, governments, and individuals in making informed decisions based on expected economic conditions. This course bridge the gap between economics and mathematics, statistics, and other quantitative fields. This interdisciplinary approach enhances the precision and depth of economic analysis to real-world issues, making it a powerful tool for informing policy decisions.

Career Options

The demand for skills in Quantitative Methods and econometrics is diverse, and individuals with these skills can find rewarding careers in a wide range of industries. Additionally, the increasing emphasis on data-driven decision-making across sectors has contributed to the growing demand for professionals with quantitative skills in economics.

[1] Academia - Professor/Researcher: Many individuals with advanced degrees in mathematical economics and econometrics pursue careers in academia. They may work as professors, researchers, or lecturers at universities, conducting research, publishing papers, and teaching students.

[2] Government Agencies - Economists / Statistician: Government agencies, such as the Bureau of Labor Statistics, the Federal Reserve, or statistical offices, often hire economists and statisticians with expertise in econometrics to analyze economic trends, conduct policy research, and generate economic forecasting.

[3] Financial Institutions - Quantitative Analyst: In the finance industry, quantitative analysts (quants) use mathematical and statistical models to analyze financial

markets, manage risk, and develop trading strategies. Econometric techniques are often employed to model financial data and forecast market movements.

[4] Consulting Firms - Economic Consultant: Consulting firms hire economists with expertise in econometrics to provide analytical support for various clients. This may involve analyzing market trends, conducting economic impact assessments, and offering strategic advice.

[5] International Organizations - Economic Analyst: Organizations such as the International Monetary Fund (IMF) or the World Bank employ economists with strong quantitative skills to conduct research, provide economic policy advice, and contribute to international development projects.

[6] Private Sector - Data Analyst/Scientist: Many companies in various industries hire data analysts or data scientists to extract insights from large datasets. Econometric techniques are valuable in this role for analysing and interpreting economic data relevant to the company's operations.

[7] Insurance Industry - Actuary: Actuaries use mathematical and statistical models to analyze financial risks, especially in the insurance industry. Skills in econometrics can be beneficial in assessing and modelling the economic factors affecting risk.

[8] Think Tanks and Research Institutions- Research Analyst: Think tanks and research institutions often employ economists with expertise in econometrics to conduct policy research, analyze economic trends, and contribute to reports and publications.

[9] Technology and Analytics Companies - Data Scientist/Analyst: Technology companies and firms specializing in analytics may seek individuals with econometric skills to analyze data for business insights, product development, and strategic decision-making.

[10] Environmental and Energy Sector - Energy Economist/Analyst: Individuals with a background in mathematical economics and econometrics may find opportunities in the energy sector, analysing trends, conducting economic impact assessments, and contributing to energy policy development.

Outputs	Outcomes
● The students will become trans-disciplinary in nature	● Student develop a solid theoretical understanding of economic principles.

● Ability to develop economic modeling based on the mathematical knowledge	● Enabling students to apply statistical techniques to real-world economic data. This enhances their ability to draw meaningful conclusions from empirical studies.
● Ability to apply statistical tools and testing the hypothesis	● Students gain proficiency in using mathematical methods to model economic relationships and analyze economic systems. This skill is valuable for understanding complex economic phenomena and making predictions.
● Student can use mathematical and statistical modeling and its relevant analysis in economic data problems	● provides them with a toolkit of statistical techniques for estimating relationships, testing hypotheses, and making inferences from data.

Major Course Outline

1. Foundation Course in Economics
2. Foundation Course in Mathematics
3. Fundamentals of Micro Economic Theory
4. Fundamentals of Macro Economic Theory
5. Quantitative Methods
6. Theory of Probability
7. Theory of Growth and Development
8. Fundamentals of Marketing
9. Fundamentals of Financial Markets
10. Mathematical Economics
11. Fundamentals of Computers