Nirma University

Institute of Technology

Mathematics and Humanities Department

Course Policy

B. Tech Semester - III (CSE/EC/IC) Academic Year: 2021-22 - Odd

Course Code & Name	**:**	**2HS0E52 – Introduction to Econometrics**
Credit Details	**:**	**L T P C** **2 1 0 3**
Course Co-ordinator	**:**	**Dr. Paramasivan S Vellala**
Contact No. & Email	**:**	9408133915 – param.vellala@nirmauni.ac.in 8469921362 - samirkmahajan@nirmauni.ac.in
Office	**:**	B-100
Course Faculty	**:**	**Dr. Paramasivan S Vellala** **Dr. Samir K Mahajan**
Course Details	**:**	https://lms.nirmauni.ac.in

1. Introduction to Course

1.1 Importance of the course

This subject helps the students to understand, analyse and evaluate the economic decisions by formulating econometric models and evaluating them in real life situations. It helps the students to acquire knowledge regarding fundamental statistical principles like central limit theorem, theory of distribution, probability distribution, t-test, f-test and p values. Interpretation of p values and R square value in the econometric reporting will help the students to predict future trends in the demand, cost, supply and other economic variables.

1.2 Objective of the Course

This subject is introduced with an objective of enabling budding engineers to interpret the various statistical tools and techniques used in the econometric model building and testing of apply econometric aspects in select cases of economic decision making like demand forecasting, production function and the growth of a firm.

1.3 Pre-requisite:

This course requires fundamental understandings of basic statistics

2. Course Learning Outcomes (CLO)

CLOs are clear statements of the expectations for student achievements in the course.

At the end of the course, students will be able to -

- interpret the various statistical tools and techniques for econometric model building and testing
- apply econometric aspects in select cases of economic decision making
- formulate and estimate appropriate models
- evaluate empirical research and develop econometric reporting

3. Syllabus Teaching Hrs

Unit I **3**

Basic Econometric Concepts: Meaning and methodology of econometrics. Understanding mathematical models and econometric models. Revision of statistical concepts – normal distribution – small and large sample tests,F-test

Unit II **3**

Data Sources, Data Base and Data Structure: - cross sectional data time series data, pooled data panel data,

Unit III

The Simple Regression Model: Regression Analysis, regression and correlation, two variable regression model, the problem of estimation, Classical Linear Regression Model – CLRM, assumptions underlying Ordinary Least Square (OLS) – standard errors – properties of least squares estimation – The Guass-Markov Theorem . **3**

Unit IV **3**

Multiple Regression Analysis: The multivariate regression analysis, the problem of estimation, interpretation of multiple regression model, OLS estimator, Maximum Likelyhood Estimator, $R^2$and adjusted $R^2$the problem of inference

Unit V **3**

Hypothesis Testing: Hypothesis testing and prediction using multiple regression analysis. Functional forms and interpretations.

Unit VI

5

Important Problems in Econometric Model Building and Testing:: Violations of classical assumptions. Nature of multicollinearity, estimation in the presence of multicollinearity, consequences of multicollinearity, remedial measures, Rule of Thumb procedures. Nature of hetroscedasticity, estimation in the presence of hetroscedasticity, consequences of hetroscedasticity. Detection – informal and formal methods, remedial measures Nature of autocorrelation, OLS in the presence of autocorrelation, Detecting autocorrelation – Durbin Watson Test and Breusch Godfrey Test (BG)

Unit VII **3**

Econometric Reporting: Evaluating the findings of empirical research – sign of coefficient of independent variables, interpretation of p-value and R^2 and F statistic probability value – a measure of goodness of fit of the model.

Unit VIII **7**

Applications and Cases: testing of hypothesis, prediction and forecasting, business policy and planning, cases – consumption function, demand function and production function.

Tutorials:

This shall consists of at least 8 *tutorials based on the syllabus.

(*E views software applications will be taught)

3.1. Self-Study :

The self -study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

3.2. References

Suggested Books:

1. Gujarati N Damodar & Dawn C Porter, Basic Econometrics, McGraw Hill International
2. Dougherty Christopher , Introduction to Econometrics, Oxford University Press
3. Baltagi H Badai , Econometrics – Springer International.
4. Rao P and R.L.Miller, Applied Econometrics Prentice Hall of India Ltd., New Delhi
5. Klein L.R., An Introduction to Econometrics, Prentice-Hall of India Ltd..
6. Goldberger A.S., Topics in Regression Analysis, Macmillan, New York
7. Dilip M.Nachane, Econometrics: Theoretical Foundations and Empirical Perspectives Oxford University Press India.
8. Levin L Richard and Rubin S Davide Statistics for Management, Prentice Hall, Pearson
9. Brown William S ,Introducing Econometrics West Group

4. Assessment Policy

4.1 Component wise Continuous Evaluation (CE), Laboratory and Project Work (LPW) & Semester End Examination (SEE) weightage

Assessment scheme	**Continuous Evaluation (CE)**			**SEE**
Component weightage	**60%**			**40%**
	Class Test 0.35	**Sessional 0.35**	**Assignment 0.30**	

4.2 Assessment Policy for Continuous Evaluation (CE)

Assessment of Continuous Evaluation comprises of three components.

1. Class Test will be conducted as per the schedule of Academic Calendar and will be of 35 marks

2. Sessional Examination will be conducted as per academic calendar. It will be of 35 marks.

3. There will be an assignment which will be given to the students on line and will be evaluated. It will be of 30 marks

5. Lesson Planning

No. of Lectures	Topics	CLO Mapping
03	**Basic Econometric Concepts**: Meaning and methodology of econometrics. Understanding mathematical models and econometric models.	**CLO1**
03	**Revision of statistical concepts** – normal distribution – small and large sample tests,F-test. **Data Sources, Data Base and Data Structure: -** cross sectional data time series data, pooled data panel data,	**CLO1**
03	**The Simple Regression Model:** Regression Analysis, regression and correlation, two variable regression model, the problem of estimation, Classical Linear Regression Model – CLRM, assumptions underlying Ordinary Least Square (OLS) – standard errors – properties of least squares estimation – The Guass-Markov Theorem	**CLO3**
03	**Multiple Regression Analysis:** The multivariate regression analysis, the problem of estimation, interpretation of multiple regression model, OLS estimator, Maximum Likelyhood Estimator, $R^2$and adjusted $R^2$the problem of inference	**CLO3**
03	**Hypothesis Testing:** Hypothesis testing and prediction using multiple regression analysis. Functional forms and interpretations.	**CLO3**
02	**Nature of multicollinearity,** estimation in the presence of multicollinearity, consequences of multicollinearity, remedial measures, Rule of Thumb procedures..	**CLO3**
02	**Nature of hetroscedasticity,** estimation in the presence of hetroscedasticity, consequences of hetroscedasticity.. Detection – informal and formal methods, remedial measures	**CLO3**
01	**Nature of autocorrelation,** OLS in the presence of autocorrelation, Detecting autocorrelation – Durbin Watson Test and Breusch Godfrey Test (BG)	**CLO3**
03	**Econometric Reporting:** Evaluating the findings of empirical research – sign of coefficient of independent variables, interpretation of p-value and R^2 and F statistic probability value – a measure of goodness of fit of the model	**CLO4**
07	**Applications and Cases:** testing of hypothesis, prediction and forecasting, business policy and planning, cases – consumption function, demand function and production function	**CLO2**

6. Mapping of Session Learning Outcomes (SLO) with Course Learning Outcomes (CLO)

Session No	**Session Learning Outcome – (SLO)**	**CLO**
01-03	Students will start the understanding the basic econometrics	CLO-1
04-06	Students will be able to understand the statistical tools used for econometric models	CLO-1
07-09	Students will be able to develop simple regression model	CLO-3
10-12	Students will be able to develop multiple regression model with many economic variables	CLO-3
13-15	Students will be able to formulate the hypothesis and the testing of hypothesis	
16-20	Students will be able to address the issues related to the violations of classical regression assumptions – the case of multicollinearity, hetroskedascity and auto correlation	CLO-3
21-23	.Students learn how to do the econometric reporting	CLO-4
24-30	Application of econometrics in economic decisions related to demand, consumption and production function	CLO-2

7. Teaching-learning methodology

1. Lectures: Primarily online mode using CISO Webex platform. However, where required, Power Point Presentations (PPTs), Video Lectures, Simulations / Animations etc. will be used to enhance the teaching-learning process.
2. Case study approach will be followed.

8. Active learning techniques

Active learning is a method of learning in which students are actively or experientially involved in the learning process. Following active learning techniques will be adopted for the course.

- Activity – 1 Intensive discussion on current macro- economic profile of India, latest data related to GDP, employment, inflation and recent policy intervention and tax reforms like Demonetization, GST and their impact on the Indian economy will be discussed by formulating econometric models and predicting futures values.
- Activity – II Innovative assignment will be given to students

9. Course Material

Following course materials are uploaded on the Moodle 3.9 with URL: https://lms.nirmauni.ac.in and study materials are uploaded under the course template – Introduction to Econometrics

- Course Policy
- Lecture Notes
- Books / Reference Books
- Innovative Assignments;
- Web-links, Blogs, Video Lectures,
- Advanced topics

10. Course Learning Outcome Attainment

Following means will be used to assess attainment of course learning outcomes.

- Use of formal evaluation components of continuous evaluation, semester end examination
- Informal feedback during course conduction

11. Academic Integrity Statement

Students are expected to carry out assigned work under Continuous Evaluation (CE) component independently. Copying in any form is not acceptable and will invite strict disciplinary action. Evaluation of corresponding component will be affected proportionately in such cases. Turnitin software will be used to check plagiarism wherever applicable. Academic integrity is expected from students in all components of course assessment.