



Applied Time Series Finance (ECO-320)

National University of Sciences & Technology
(NUST)

BS AC&F 2K22

Course Details:

Course Title: Applied Time Series Finance

Credit Hours: 3

Course Code: ECO-320

Pre-requisite(s): (ECO-215; STATS-221)

Program: BS AC&F 2K20

Sections: A & B

Course Description:

Financial time series data are intriguing yet complicated information to work with. This course provides students with a basic understanding of the complexities and application of basic concepts and processes of financial forecasting. Heavy emphasis will be given to the application of the fundamental concepts pertaining to financial time series modelling including exploratory data analysis tools, univariate time series modelling, and multivariate time series modelling. We will do so by engaging extensively in the use of the statistical software, STATA. Although the motivation of this course is drawn from finance, it may also prove to be useful for other disciplines such as management studies, marketing, economics, and other relevant streams. While time series modelling techniques are considered in detail, other econometric methods such as panel data analysis will also be employed.

Course Learning Outcomes:

1. Demonstrate an understanding of time-dependent financial data and its inherent characteristics.
2. Compare various statistical methods underlying the data analysis of time series data, the most important time series models, and their properties.
3. Apply the appropriate computational time series techniques to analyze data and make inferences such as estimation and forecasts.
4. Examine the appropriateness of predictions using relevant methods.
5. Understand the key features of panel data and outline the commonly used models.

Program Goals & Learning Objectives:

The goals & learning objectives of the BS AC&F Program are:

Goal 1: Students will acquire knowledge to analyse business problems

LO 1.1: Students will be able to understand problems in a business setting

LO 1.2: Students will be able to analyse problems using business knowledge

Goal 2: Students will work in team settings

LO 2.1: Students will be able to work towards achieving team goals

LO 2.2: Students will be able to demonstrate effective team behaviour

Goal 3: Students will learn to communicate effectively

LO 3.1: Students will be able to communicate effectively in oral presentations

LO 3.2: Students will be able to create professional reports

Goal 4: Students will deal with the ethical dilemmas that arise in a business environment

LO 4.1: Students will be able to identify ethical concerns emanating from a business situation

LO 4.2: Students will be able to apply ethical guidelines to address business problems by examining a set of alternatives

Mapping - CLOs with LOs

Learning Objective	LO 1.1	LO 1.2	LO 2.1	LO 2.2	LO 3.1	LO 3.2	LO 4.1	LO 4.2	Not mapped	Evaluation Item
CLO 1	•									Assignments
CLO 2	•									Quiz 1 and 2
CLO 3		✓								ESE
CLO 4		✓								ESE
CLO 5	•									Quiz 3

Note: ✓ indicates mapped and assessed CLOs. • indicates mapped but not assessed.

AOL Assessment

LO 1.2 is assessed by ESE. Level of LO 1.2 is reinforcement.

Required Course Material:

Reference Book (s):

Damodar, N. G. (2021). Basic econometrics.

Brooks, C., Introductory Econometrics for Finance, Cambridge University Press. (IEF hereafter).

Other Material:

- Relevant practice datasets available on LMS each week
- Weekly supplementary material/explanations shared via LMS

Course Evaluation:

Grading will be done as per NBS criteria. The breakup is as follows:

Final Exam	40%
Midterm	25%
Quizzes	15%
Assignments	15%
CP	5%

Weekly Schedule:

Week	Lecture No. and Topic	Preparation Material	Session Outcomes (Students should be able to...)
1	LECTURE 1: - An overview of the course - Application of time series modelling in finance LECTURE 2: - Introduction and Mathematical Foundations	IEF Chapter 01	Understand the nature and application of the Applied Time Series in finance (CLO#1)
2	LECTURE 3: - THE NATURE OF REGRESSION ANALYSIS LECTURE 4: - Practice session	BE Chapter 1 Lab practical	Understand regression, the most important time series models, and their properties (CLO#2)
3	LECTURE 5: - Practice session LECTURE 6: - Two variable regression model: The problem of estimation	Lab practical BE Chapter 1	Explain the processes in univariate time series modelling (CLO#2)
4	LECTURE 7: - Practice session LECTURE 8: - Multiple regression Analysis	Lab practical BE Chapter 7	Explain the processes in multivariate time series modelling (CLO#2)
5	LECTURE 9: - Multiple regression Analysis LECTURE 10: - Practice session	BE Chapter 07 Lab practical	Explain the processes in Multivariate time series modelling (CLO#2)
6	LECTURE 11: - Dummy Variable regression model LECTURE 12: - Dummy Variable	BE Chapter 09	Apply the dummy variable to time series technique(s) to analyze data and make inferences (CLO#3)

	regression model		
7	LECTURE 13: - Practice session LECTURE 14: - Practice session	Lab practical	Understand analysis of time series data, in presence of dummy variables, and their properties (CLO#2)
8	LECTURE 15: - Multicollinearity: ?what happens if the regressors are correlated? LECTURE 16: - Multicollinearity: ?what happens if the regressors are correlated?	BE Chapter 10	Issue of multicollinearity, its consequences and remedial actions (CLO#3)
9	<u>MID-TERM EXAM WEEK</u>		
10	LECTURE 17: - Practice session LECTURE 18: - Practice session	Lab practical	Issue of multicollinearity, its consequences and remedial actions (CLO#3)
11	LECTURE 19: - Panel data regression models LECTURE 20: - Panel data regression models	BE Chapter 16	Apply the appropriate panel data techniques (CLO#3)
12	LECTURE 21: - Practice session LECTURE 22: - Practice session	Lab practical	Apply the appropriate panel data techniques (CLO#3)
13	LECTURE 23: Modelling long-run	BE Chapter 17	Understand the modelling of long-run relationships in finance

	relationships in finance (part I) LECTURE 24: Modelling long-run relationships in finance (part II)		(CLO#1)
14	LECTURE 25: - Practice session LECTURE 26: - Practice session	Lab practical	Understand the modelling of long-run relationships in finance (CLO#1)
15	LECTURE 27: - Time series econometrics LECTURE 28: - Time series econometrics	BE Chapter 21	Understand basic concepts of time series econometrics (CLO#5)
16	LECTURE 29: - Practice session LECTURE 30: - Practice session	Lab practical	Apply basic concepts of time series econometrics (CLO#5)
17		BUFFER WEEK	
18	<u>FINAL EXAM WEEK</u>		