ECONOMIC FORECASTING

Course code	*ECO108*
Compulsory in the programmes	*Economics and Data Analytics*
Level of studies	*Undergraduate*
Number of credits	*6 ECTS (48 in-class hours + 6 consultation hours + 2 exam hours, 106 individual work hours)*
Course coordinator (title and name)	*Assoc. prof. Dr. Mindaugas Kavaliauskas*
Prerequisites	*Statistical Data Analysis, Econometrics*
Language of instruction	*English*

THE AIM OF THE COURSE:

The course is aimed at the students who need to have a basic knowledge of methods for time series analysis and obtain practical skills of forecasting, with a focus on economic applications

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Learning objectives for BSc in Business Management	Learning objectives for BSc in Social Science	Assessment methods	Teaching methods
CLO1. Understand quantitative methods for economic forecasting	BLO1.1	ELO1.1	Assignments, Mid-term exam, Final exam	Lectures, practice, individual work hours
CLO2. Apply mathematics techniques to solve forecasting problems associated with their discipline	BLO1.2	ELO1.2	Assignments, Mid-term exam, Final project, Final exam	Lectures, practice, individual work hours
CLO3. Apply software for numeric data analysis and forecasting	BLO3.2	BLO3.2	Assignments, Final project	Lectures, practice, individual work hours
CLO4. Able to work in groups, present forecasting results in written and oral form, provide motivated arguments about method selection	BLO4.1, BLO4.2, BLO4.3	ELO4.1, ELO4.2, ELO4.3	Final project	Lectures, practice, individual work hours

ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM remind students that they are expected to adhere and maintain the same academic honesty and integrity that they would in a classroom setting.

UNIVERSITY OF MANAGEMENT AND ECONOMICS

COURSE OUTLINE

Topic	In-class hours	Readings
1. Introduction to R data analysis software. Environment, language syntax. Main functions.	4	[1] 1.1-1.7, 3.1-3.8, [2] 1, [3] 1.1, [7] 5.1-5.3
2. Time series. Data preparation and filtering.	4	[1] 2.1-2.2, 5.7, 4.6; [3] 2.5-2.6
3. Simple forecasting methods. Accuracy estimation techniques and metrics	4	[1] 2.3-2.7, [4] 2, [5] 5.4, [6] 3
4. Time series components. Decomposition models.	4	[1] 6.1-6.6, [5] 7.2
5. Exponential smoothing methods	4	[1] 7.1-7.7
6. Regression in time series models: trend, seasonality estimation, distributed lags, structural changes	4	[1] 4.1-4.7, 5.1-5.2, 5.4-5.5; [2] 6, [5] 4.1-4.12
MID-TERM EXAM	2	
7. Autoregressive moving average (ARMA) processes. Stationary time series	4	[1] 8.1-8.4; [2] 14, [3] 1-2, 4, 6
8. Basic and seasonal ARIMA	2	[1] 8.5-8.10, [3] 5.1-5.4, [2] 14.5, [7] 4
9. Neural network autoregression	4	[1] 11.3
10. Other forecasting methods	4	[1] 10, 11.1, 12
11. Multivariate time-series, VAR model	4	[1] 11.2, [2] 16, [3] 5.5-5.6
12. Final project presentation	4	
	Total: 48 hours	
CONSULTATIONS	6	
FINAL EXAM	2	

FINAL GRADE COMPOSITION

Type of assignment	%
Group Components 17%	
Final project	17
Individual Components 83%	

UNIVERSITY OF MANAGEMENT AND ECONOMICS

Assignment 1	9
Assignment 2	9
Mid-term exam	28
Assignment 3	9
Final exam	28
Total:	**100**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

Assignments grades is the weighted average of every task in the assignment. Mid-term exam and final exam will be presented as closed answers multi-choice tests with weight of each question will be indicated next to question. Mid-term will include topics presented on Weeks 1 to 6. The Final exam will include the rest of the topics, i.e., Weeks 7 to 12.
Final project grade consists of these parts: presentation and question answering 50%, project report 50%.
Bonus points up to 10% can be awarded for the most active participation in lectures.

RETAKE POLICY

Students must score for all 4 tasks of the semester (midterm exam, practical assignments, individual final project and final exam) at the specified time (see, *Weekly Course Content*). Some postponing (for example, lag of 1 week) is possible for exercises and practical assignments but is not recommended. Postponing of the individual project is impossible and explicit retake of the midterm exam will not be allowed. Only in case of the negative final evaluation student has a possibility of overall retake. Retake exam topics will cover the material of the whole course and will comprise **56%** of the final mark, while previous evaluations of exams (midterm and final) are annulled. Precision of composite evaluations is left intact (up to 2 decimal places) until the end of semester and only the final evaluation will be subject to rounding.

ADDITIONAL REMARKS

R statistical software will be used in the course.

REQUIRED READINGS

1. Hyndman, R.J., Athanasopoulos, G. (2018). Forecasting: principles and practice. http://otexts.com/fpp2/.

ADDITIONAL READINGS

2. Stock, James H., Watson Mark W. (2007). Introduction to Econometrics. Boston: Pearson Education, Inc.
3. Enders, W. (2009). Applied Econometric Time Series (3rd Edition). New York: John Wiley & Sons, Inc.
4. Evans, M.K. (2008). Practical Business Forecasting. Oxford: Blackwell Publishers.
5. Render, B., Stair, R.M., Hanna, M.E. (2011). Quantitative Analysis for Management (11th Edition). Prentice Hall.
6. Stevenson, W.J. (2012). Operations Management (11th Edition). McGraw-Hill Higher Education.
7. Hayes, A.F., Slater, M.D., Snyder, L.B. (2008). The SAGE Sourcebook of Advanced Data Analysis Methods for Communication Research. SAGE Publications.
8. Makridakis, S., Wheelwright S.C., Hyndman, R.J. (1998). Forecasting Methods and Applications (3rd Edition). New York: John Wiley & Sons, Inc.
9. Clements, M.P., Hendry, D.F. (2011). The Oxford Handbook of Economic Forecasting. Oxford University Press.
10. Zellner, A. (2004). Statistics, Econometrics and Forecasting. Cambridge University Press.

ANNEX

DEGREE LEVEL LEARNING OBJECTIVES

Learning objectives for the <u>Bachelor of Business Management</u>
Programmes:
International Business and Communication,
Business Management and Marketing, Finance,
Industrial Technology Management

Learning Goals	Learning Objectives
Students will be critical thinkers	BLO1.1. Students will be able to understand core concepts and methods in the business disciplines
	BLO1.2. Students will be able to conduct a contextual analysis to identify a problem associated with their discipline, to generate managerial options and propose viable solutions
Students will be socially responsible in their related discipline	BLO2.1. Students will be knowledgeable about ethics and social responsibility
Students will be technology agile	BLO3.1. Students will demonstrate proficiency in common business software packages
	BLO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	BLO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	BLO4.2. Students will be able to convey their ideas effectively through an oral presentation
	BLO4.3. Students will be able to convey their ideas effectively in a written paper

Learning objectives for the <u>Bachelor of Social Science</u>
Programmes:
Economics and Data Analytics,
Economics and Politics

Learning Goals	Learning Objectives
Students will be critical thinkers	ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines
	ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements
Students will have skills to employ economic thought for the common good	ELO2.1.Students will have a keen sense of ethical criteria for practical problem-solving
Students will be technology agile	ELO3.1. Students will demonstrate proficiency in common business software packages
	ELO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	ELO4.1.Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	ELO4.2.Students will be able to convey their ideas effectively through an oral presentation
	ELO4.3. Students will be able to convey their ideas effectively in a written paper