

# TOROS ÜNİVERSİTESİ

Faculty Of Engineering  
Industrial Engineering (English)

## Course Information

FORECASTING METHODS					
Code	Semester	Theoretical	Practice	National Credit	ECTS Credit
		Hour / Week			
INE308	Spring	3	0	3	3

<b>Prerequisites and co-requisites</b>	None
<b>Language of instruction</b>	English
<b>Type</b>	Elective
<b>Level of Course</b>	Bachelor's
<b>Lecturer</b>	Assist.Prof. Dr. Türker ERTEM
<b>Mode of Delivery</b>	Face to Face
<b>Suggested Subject</b>	None
<b>Professional practise ( internship )</b>	None
<b>Objectives of the Course</b>	This course is an introduction to the widely used and effective methods of forecasting and regression. The aim is to introduce students ways to aid managerial decision making by applying a statistical approach and quantitative analysis. The emphasis will be upon the use of mathematical methodology and the written communication of statistical results.
<b>Contents of the Course</b>	An introduction to forecasting. Basic statistical concepts. Regression Analysis: Simple linear regression. Multiple linear regression. Least squares estimates of parameters. Hypothesis testing and confidence intervals in linear regression models. Testing of models. Data analysis and appropriateness of models. Linear time series models. Moving average. Autoregressive and/or ARIMA models. Estimation, data analysis, and forecasting with time series models. Forecasting errors and confidence intervals.

## Learning Outcomes of Course

#	Learning Outcomes
1	Students shall collect data for forecasting processes and analyses
2	Students shall analyse the relationship between the variabes
3	Students shall forecast the future by evaluating current variables
4	Students shall identify the form and direction of the relationship between the variables
5	Students shall make forecasting hypothesis

## Course Syllabus

#	Subjects	Teaching Methods and Technics
1	I. An Introduction to Forecasting 1.1 Forecasting and Data 1.2 Forecasting Methods 1.3 Errors in Forecasting	lecturing, problem solving, discussing
2	1.4 Choosing a Forecasting Technique 1.5 An Overview of Quantitative Forecasting Techniques	lecturing, problem solving, discussing
3	II. Basic Statistical Concepts 2.1 Populations 2.2 Probability 2.3 Random Samples and Sample Statistics 2.4 Continuous Probability Distributions	lecturing, problem solving, discussing
4	2.5 The Normal Probability Distribution 2.6 The t-Distribution, the F-Distribution, and the Chi-Square Distribution	lecturing, problem solving, discussing
5	2.7 Confidence Intervals for a Population Mean 2.8 Hypothesis Testing for a Population Mean	lecturing, problem

		solving, discussing
6	III. Simple Linear Regression 3.1 The Simple Linear Regression Model 3.2 The Least Squares Point Estimates 3.3 Point Estimates and Point Predictions	lecturing, problem solving, discussing
7	3.4 Model Assumptions and Standard Error 3.5 Testing the Significance of the Slope and -Intercept 3.6 Confidence and Prediction Intervals	lecturing, problem solving, discussing
8	3.7 Simple Coefficients of Determination and Correlation 3.8 An F-Test for the Model 3.9 Some Shortcut Formulas	lecturing, problem solving, discussing
9	IV. Multiple Linear Regression 4.1 The Linear Regression Model 4.2 The Least Squares Estimates, Point Estimation, and Prediction 4.3 The Mean Square Error and The Standard Error	lecturing, problem solving, discussing
10	4.4 Model Utility: $R^2$ , Adjusted $R^2$ , and the Overall F-Test 4.5 Testing the Significance of an Independent Variable 4.6 Confidence and Prediction Intervals	lecturing, problem solving, discussing
11	4.7 The Quadratic Regression Model 4.8 Interaction	lecturing, problem solving, discussing
12	4.9 Using Dummy Variables to Model Qualitative Independent Variables 4.10 The Partial F-Test: Testing the Significance of a Portion of a Regression Model	lecturing, problem solving, discussing
13	VI. Time Series Regression 6.1 Modeling Trend by Using Polynomial Functions 6.2 Detecting Autocorrelation	lecturing, problem solving, discussing
14	6.3 Types of Seasonal Variation 6.4 Modeling Seasonal Variation by Using Dummy Variables and Trigonometric Functions	lecturing, problem solving, discussing
15		
16	Final Exam	

## Course Syllabus

#	Material / Resources	Information About Resources	Reference / Recommended Resources
1	Bowerman, B. L., O'Connell, R. T., and Koehler, A. B. Forecasting, Time Series, and Regression	Thomson Brooks/Cole Publishing	
2	Gilchrist, W. Statistical Forecasting	John Wiley & Sons Ltd	
3	Hamilton, J. D., Time Series Analysis	Princeton University Press	

## Method of Assessment

#	Weight	Work Type	Work Title
1	30%	Mid-Term Exam	Mid-Term Exam
2	30%	Mid-Term Exam	Mid-Term Exam
3	40%	Final Exam	Final Exam

## Relationship between Learning Outcomes of Course and Program Outcomes

#	Learning Outcomes	Program Outcomes	Method of Assessment
1	Students shall collect data for forecasting processes and analyses	1,4,11	1,2,3
2	Students shall analyse the relationship between the variables	1,4,11	1,2,3
3	Students shall forecast the future by evaluating current variables	1,4,11	1,2,3
4	Students shall identify the form and direction of the relationship between the variables	1,4,11	1,2,3
5	Students shall make forecasting hypothesis	1,4,11	1,2,3

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

## Work Load Details

#	Type of Work	Quantity	Time (Hour)	Work Load

1	Course Duration	14	3	42
2	Course Duration Except Class (Preliminary Study, Enhancement)	14	5	70
3	Presentation and Seminar Preparation	0	0	0
4	Web Research, Library and Archival Work	0	0	0
5	Document/Information Listing	0	0	0
6	Workshop	0	0	0
7	Preparation for Midterm Exam	2	6	12
8	Midterm Exam	2	2	4
9	Quiz	0	0	0
10	Homework	0	0	0
11	Midterm Project	0	0	0
12	Midterm Exercise	0	0	0
13	Final Project	0	0	0
14	Final Exercise	0	0	0
15	Preparation for Final Exam	1	9	9
16	Final Exam	1	2	2
				<b>139</b>