IE 412 APPLIED TIME SERIES ANALYSIS

Year and Semester : 2025-2026 Spring
Credit Hour : (3 0 3)
ECTS : 5
Prerequisite(s) : None

CATALOG DESCRIPTION

Introduction; time series; components of time series; autocorrelation; strong and weak stationarity; AR models, MA models; ARMA models; model identification and estimation; non-stationarity and unit root tests; ARIMA models; SARMA models; SARIMA models; model identification, estimation and forecasting of seasonal models; tests for seasonal unit roots.

REFERENCE BOOKS

- Brockwell, P.J. & Davis, R.A. *Introduction to Time Series and Forecasting (2nd ed.)*, Springer, 2002.
- Janacek, G.J. *Practical Time Series*, Arnold, 2001.
- Cryer, J.D. & Chan, K-S. *Time Series Analysis with Applications in R (2nd ed.)*, Springer, 2008.
- Cowpertwait, P.S.P. & Metcalfe, A.V. *Introductory Time Series with R*, Springer, 2009.

COURSE OBJECTIVE

The aim of this course is to give a basic knowledge and understanding of time series analysis and its applications. During the course, skill in collecting data from various databases as well as modeling and forecasting it by using statistical package programs will be pursued.

LEARNING OUTCOMES

On successful completion of this course, students/learners will have:

- Knowledge and understanding of time series analysis and its applications.
- Skills in modeling and forecasting time series data.
- Skills in using time series package program.
- Skills in collecting data from databases.
- Skills in report writing.
- Awareness of ethical issues.

COURSE OUTLINE

Week 1 : Introduction to time series.
Week 2 : Components of time series, stationarity, autocorrelation function.
Week 3 : Stationarity, transformation methods to make a nonstationary series stationary.
Week 4 : Stationary models: AR.
Week 5 : Stationary models: MA.
Week 6 : Stationary models: ARMA.
Week 7 : Model identification of stationary non-seasonal time series.
Week 8 : Estimation of stationary non-seasonal models.
Week 9 : Forecasting stationary non-seasonal time series.
Week 10 : Non-stationary models: ARIMA, unit root tests.
Week 11 : Seasonal models: SARMA, SARIMA.
Week 12 : Model identification of seasonal time series.
Week 13 : Estimation and forecasting of seasonal models.
Week 14 : Tests for seasonal unit roots.

COMPUTER USAGE

Students will use word editing and statistical tools/programs while doing their homework and project.

GRADING

Assessment Item	# Sub-Assessment Item	Weight (%)
Homework Assignment	2	10
Project	1	15
Midterm Exam	1	35
Final Exam	1	40
TOTAL		100

LECTURE HOURS

Day	Time	Classroom
Tuesday	14.20 – 15.10	LB 05
	15.20 – 16.10	
	16.20 – 17.10	

LECTURER

Tolga Temuçin, Ph.D.
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IMPORTANT NOTES

- Communication will be made through http://webonline.cankaya.edu.tr. Announcements should be checked regularly. Students should check their accounts to make sure that they can access the page of IE 412 through *webonline*.
- Students should follow the lectures and study the course material regularly.
- The University Senate has decided to require **a minimum attendance of 60%** for all classes. **Students who do not meet the attendance requirement will not be allowed to take the end-of-semester exams.** If a student in this situation takes the exams, their exam will be considered invalid. **Report periods counted as absences.**
- Make-up exams are given only for students who have medical reports. All medical excuse reports should be officially submitted within 7 working days (starting from the end-date of the medical excuse). Make-up exams will not be given for applications which are not submitted on time.
- There are no make-ups for missing homework or case study/project submissions.
- Any sort of plagiarism will not be tolerated and disciplinary measures will be taken.