KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

MATHEMATICS DEPARTMENT

STAT 460: Time Series - Term 242

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Office Hours: UTR: 11-11:50 or by appointment

Course Description: Examples of simple time series. Stationary time series and autocorrelation. Autoregressive moving average processes. Modeling and forecasting with ARMA processes. Maximum likelihood and least squares estimator. Nonstationary time series.

Prerequisite: STAT 310

Textbook: Time Series Analysis with Applications in R by Jonathan D. Cryer • Kung-Sik Chan, 2nd Edition, Springer, 2008.

Software Packages: RStudio statistical language. Students are required to download RStudio onto their laptop computers for assignments and practice.

Assessment

Assessment for this course will be based on homework and/or quizzes, term project, two major exams and a comprehensive final exam, as in the following:

Activity	Weight
Homework and other class activities	10%
Term project	10%
Quizzes	10%
Exam 1: (Ch:1-3)	20%
Exam 2: (Ch:4-5, Ch6:6.1-6.2)	20%
Final Exam (Comprehensive): TBA	30%

*You need to achieve at least 50% in order to pass the course

Academic Integrity: All KFUPM policies regarding ethics and academic honesty apply to this course.

Important Notes:

- ✓ Unexcused absences will result in a grade of DN in accordance with University rules.
- ✓ Attendance on time is very important.
- ✓ Homework is due in class every Sunday a chapter is completely covered.
- ✓ A class quiz is often given at the end of the following week a chapter is completely covered.
- ✓ A formula sheet and statistical tables will be provided for you in every exam.

Course Contents

Week	Date	Sections	Topics
1	Jan. 12-16	1.1-1.2 & 2.1	Introduction: Examples of Time Series, A Model-Building Strategy, Time Series and Stochastic processes
2	Jan. 19-23	2.2-2.4	Means, Variances, and covariances, Stationarity, Summary
3	Jan. 26-30	3.1-3.3	Deterministic Versus Stochastic Trends, Estimation of a constant mean, Regression Methods.
4	Feb. 02-06	3.3-3.6	Regression Methods (Continued): Interpreting Regression Output, Residual Analysis
5	Feb.09-13	3.6-3.7	Residual Analysis (Continued), Summary
6	Feb.16-20	4.1-4.2	General Linear Processes, Moving Average processes
7	Feb. 23-27	4.3	Autoregressive Processes
8	Mar.02-06	4.3-4.5	Autoregressive Processes (Continued), The Mixed Autoregressive Moving Average Model. Invertibility
9	Mar. 09-13	5.1-5.2	Stationarity Through Differencing, ARIMA Models
10	Mar. 16-20	6.1-6.2	Properties of the sample Autocorrelation Function, The partial and Extended Autocorrelation Functions
11	Apr. 06- 10	6.3-6.6	Specification of Simulated Time Series, Nonstarionarity, Other specification Methods, specification of Some actual Time Series.
12	Apr.13-17	7.1-7.3	The method of Moments, Least Squares Estimation, Maximum Likelihood and Unconditional Least Squares
13	Apr. 20-24	7.4-7.5	Properties of the Estimates, Illustrations of Parameter Estimation.
14	Apr.27- May 01	8.1, 9.1-9.2	Residual Analysis, Minimum Mean Square Error Forecasting, Deterministic Trends
15	May. 04-08	9.3, 10.1-10.5	ARIMA Forecasting, Seasonal Models, Forecasting Seasonal Models. (If Time permits)
16	May 11		Forecasting Seasonal Models. (If Time permits)