KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

STAT 460: Time Series - Term 161

Instructor: Dr. Marwan Al-Momani   **Office:** Bldg. 5-319.

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Office Hours: UTR: 10-10:50 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: MINITAB and R Statistical software

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	15%
Exam 1 : October 23, 2016(Ch:1-3)	20%
Exam 2: December 4, 2016 (Ch:4-5, Ch6:6.1-6.2)	20%
Final Exam (Comprehensive): TBA	35%

*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.
✓ A formula sheet and statistical tables will be provided for you in every exam.

Course Contents

Week	Sections	Topics
1 Sept. 18-21	1.1-1.2 2.1	Introduction: Examples of Time Series, A Model-Building Strategy , Time Series and Stochastic processes
Sep. 22 (National Holiday)		
2 Sept. 25-29	2.2-2.4	Means, Variances, and covariances, Stationarity, Summary
3 Oct. 2-6	3.1-3-3	Deterministic Versus Stochastic Trends, Estimation of a constant mean, Regression Methods.
4 Oct. 9- 13	3.3 3.5-3.6	Regression Methods (Continued): Interpreting Regression Output, Residual Analysis
5 Oct.16-20	3.6-3.7	Residual Analysis (Continued), Summary
6 Oct. 23-.27	4.1-4.2	General Linear Processes, Moving Average processes
7 Oct. 30-Nov. 3	4.3	Autoregressive Processes
8 Nov.6-10	4.3-4.5	Autoregressive Processes (Continued), The Mixed Autoregressive Moving Average Model. Inevrtibility
November. 13 - 17 : Midterm Break		
9 Nov. 20-24	5.1-5.2	Stationarity Through Differencing, ARIMA Models
10 Nov. 27-Dec.1	6.1-6.2	Properties of the sample Autocorrelation Function, The partial and Extended Autocorrelation Functions
11 Dec. 4-8	6.3-6.6	Specification of Simulated Time Series, Nonstarionarity, Other specification Methods, specification of Some actual Time Series.
12 Dec.11-15	7.1-7.3	The method of Moments, Least Squares Estimation, Maximum Likelihood and Unconditional Least Squares
13 Dec. 18-22	7.4-7.5	Properties of the Estimates, Illustrations of Parameter Estimation.
14 Dec.25-29	8.1, 9.1-9.2	Residual Analysis, Minimum Mean Square Error Forecasting, Deterministic Trends
15 Jan.1-5	9.3, 10.1-10.5	ARIMA Forecasting, Seasonal Models, Forecasting Seasonal Models. (If Time permits)
16 Jan.6		Review and catch up