KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS
STAT 460 – Time Series
Course Outline

Instructor: Emmanuel Afuecheta   **Office**: (5-320)
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Office Hours: Mon: 11-11:50am and 2-3:50pm

Course Description (3-0-3):
Examples of simple time series. Models for stationary and nonstationary time series. Analysis of trends using regression methods. ARIMA model specification. Transformations, Parameter Estimation, model diagnostics, forecasting, and seasonal ARIMA models, and ARCH and GARCH models

Learning Outcomes
By the end of the term successful students should be able to do the following:
- ➢ Recognize the relationships between time series data and basic metrics including mean, variance, autocovariance, and autocorrelation.
- ➢ Recognize the typical models employed in time series analysis.
- ➢ Define and estimate appropriate models for real time series data.
- ➢ Validate models and take corrective action to enhance them.
- ➢ Carry out sophisticated time series data analytics, including forecasting and inference

Course Objectives

Project: A data-analysis assignment is required of all students. The project will involve the use of techniques we have learnt in this semester to analyze a real time series data set of interest, as well as a typed report outlining the results of the analyses. The project's specifics will be revealed around a month into the course.

Textbooks: Cryer, J. D. and Chan, K. (2009). Time Series Analysis with Applications in *R*, 2nd Edition, Springer, New York, USA.

Additional Reference: Diebold, F. X. (2007). Elements of Forecasting. 4th Edition, Thomson, South-Western, Mason OH, USA.
Software: *R* language.

Activities	Weight
Class Activities (Assignments, Quizzes and participation)-Maximum 2	10%
Term Project (Group-maximum of 4 persons per group)	15%
First Major	20%
Second Major	20%
Final exam (comprehensive)	35%

Grades: The letter grades will be assigned based on relative performance of the registered students.

General Notes:

- Students are required to carry **pens, binder** and a **calculator** with statistical functions to **EVERY lecture, and exam**.
- Students are also expected to take class notes and organize their learning material in a binder for easy retrieval to help them in study and review for class, exams, etc. It is to the student's advantage to keep a binder for storing class notes, homework, and other graded assignments. Students who are organized will find it easier to find important materials when studying for exams.
- To effectively learn statistics, students need to *solve problems* and *analyze data*. The selected assigned problems are specifically designed to prepare you for class quizzes, lab, majors and final exam. So, it is expected that you complete these problems *step-by-step* and with *comprehension*.
- ***Never round*** your intermediate results to problems when doing your calculations. This will cause you to lose calculation accuracy. Round only your final answers and you should not round less than 4 decimal places unless required otherwise.
- ***A formula sheet*** and *statistical tables* **will be given for you in every exam, so you only need to bring with you** *pens, pencils, a sharpener, an eraser*, **and a** *calculator*.

Important Notes:

- Students will be required to carry a scientific calculator ***with statistical functions*** to ***every class, quiz, and exam***.
- In accordance with University rules, ***Nine (9) unexcused absences*** will automatically result in a grade of ***DN***. It is students' responsibility to provide valid written excuses on time before a ***DN*** report is issued.
- ***Attendance*** on time is ***very*** important.
- Mostly, attendance will be checked within the ***first five minutes*** of the class. Entering the class after that, is considered as one late, and ***every two lateness*** equals to one absence.
- All contacts or announcements between the instructor and the students are supposed to be held on Blackboard, so the student ***must*** check his Blackboard inbox ***at least once*** a day.

Cheating and Plagiarism

This course is composed of individual assignments. It is important that your individual assignment be completed with your own efforts instead of copying it from your fellow student. KFUPM instructors follow "zero tolerance" approach with regard to cheating and plagiarism. During examinations (quizzes, major exams, lab tests) cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a "grade of F" in the course along with reporting the incident to the higher university administration.

Missing an Exam:

Missing an Exam: In case a student misses an exam (Exam I, Exam II, or the Final Exam) for a legitimate reason (such as medical emergencies), he must bring an official excuse from Students Affairs. Otherwise, he will get zero in the missed exam."

R is the computational software for this course.