

CENTRAL WASHINGTON UNIVERSITY
Mathematics 414, Time Series Analysis

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OVERVIEW OF COURSE

OVERALL COURSE OBJECTIVES:

1. To deliver the knowledge of time series theory, to practice model building, parameter estimation, to perform diagnosis checking, and to forecast based on the data series and the model.
2. To master standard time series models, such as the moving average (MA), autoregressive (AR), integrated autoregressive-moving average (ARIMA), and others if time permits.

Student Outcomes:

Students will gain an understanding of the relation between probability and mathematical statistics, and will study the most important probability distributions, learning the situations in which they arise. Students will be able to find the distribution of functions of random variables and will learn the basic statistical distributions that are derived from the normal distribution. They will be able to find the distribution of order statistics such as the sample minimum, sample maximum and the i -th order statistic. Students will also learn how to set confidence intervals on unknown parameters, and will also learn methods of statistical estimation, including least squares, method-of-moments, and maximum likelihood.

COURSE MATERIALS REQUIRED:

Robert Pindyck and Daniel Rubinfeld "Economic Models and Economic Forecasts", 4th Edition, Irwin McGraw-Hill, 1998. Part 4 Time-Series Models will be covered.

Students should reference to Part 1-3 for solid background needed.

COURSE OUTLINES:

- Smoothing and extrapolation of time series
- Properties of Stochastic Time series, stationary and non-stationary time series, autocorrelation function of stationary time series.
- Linear Time Series Models: moving average, autoregressive, mixed autoregressive-moving average models.
- Estimation and Forecasting with Time Series Model

Advance reading of the problems and text material is essential to good performance in this course. Advice from previous students is: "If you want to do well, *go to class every day, study your notes, and do not fall behind.*"

COURSE POINTS:

Homework and participations	120 points
Lab assignments	150 points
Three Chapter Tests	150 points
Final	80 points
<hr/> Total	<hr/> 500 points

Text Problems to Explore:

Chapter 15: 1, 3, 5, 6

Chapter 16: 1-5

Chapter 17: 1-8

Chapter 18: 1-10

Chapter 19: 1

LEVEL OF AWARENESS ISSUES INCORPORATED IN THIS COURSE:

AWARENESS ISSUE	-----ACTIVITY LEVEL-----			
	NONE	LOW	MODERATE	HIGH
Graphical Distribution Display				*
Interpret Information				*
Mathematical Proof			*	
Statistical Methods	*			
Personal Work Quality Goals				*
Class Participation				*

SCHEDULE OF CLASS TOPICS AND ASSIGNMENTS

A tentative list of timing of topic coverage and chapter tests is presented below. Due to the intensive nature of the course, and possible variability in student backgrounds and learning process, we may deviate from this schedule.

<u>Week</u>	<u>Sections</u>	<u>Work Due</u>
1. 3/26-3/30	15.1, 15.2	Lab 1, HW1
2. 4/2-4/6	16.1-16.2	Lab 2, HW2
3. 4/9-4/13	16.3-16.4	Lab 3, HW3
4. 4/16-4/20	Review	Lab 4
TEST 1: Chapter 16		
5. 4/23-4/27	17.1-17.2	Lab 5, HW4
6. 4/30-5/4	17.3-17.4	Lab 6, HW5
7. 5/7-5/11	17.5 Review	Lab 7
TEST 2: Chapter 17		
8. 5/14-5/18	18.1-18.2	Lab 8, HW6
9. 5/21-5/25	18.3-18.4	Lab 9, HW7
10. 5/28-6/1	18.5 Review	
TEST 3: Chapter 18		
11. 6/4-6/8	FINAL EXAM WEEK	

TEST POLICY

Because of the timely nature of the tests, no make-ups will be given. A grade of zero will be assigned unless you contact me **before** the scheduled time and provide an acceptable excuse. A weighted average of your score on the remaining tests will be used for the missing score. Final examination policy is as established by the Dean of Students.

HOMEWORK POLICY

Homework will be assigned and collected. Working on exercises and homework is the only way most of us learn to critically analyze and “solve” problems. Some class time will be devoted to questions on the exercises and homework. Office hours are also scheduled to provide opportunities for more in-depth discussion of homework problems. Your homework must be well **stapled** and written/printed on **flat papers**. Failing to do any one of the above will result in losing homework points. No late homework will be accepted unless you contact me and provide an acceptable reason.

ATTENDANCE AND PARTICIPATION

Attendance and class participation are important to this course. If you miss excessive number of classes, your final grade will be affected. Students are expected to have no more than two unexcused absences for the entire quarter.

INCOMPLETES:

An "I" is appropriate *only* if you have finished almost all of the course requirements, and have a good chance of completing the course without re-enrolling. (Example: missing the final exam due to illness.) The course must be completed within a year; otherwise, the "I" reverts to an "F."

LEAVE OF ABSENCE:

Students who may consider taking a quarter off for extenuating circumstances:

The following procedures should be followed, so they don't have to re-apply to the University after sitting out for only one quarter. The policy states:

Students who do not enroll for consecutive academic quarters (exclusive of summer) must reapply for admission. However, if students meet the criteria below, they may be granted a leave of absence, which means that they do not have to reapply for the following quarter and that they may register early for classes as continuing students at the designated time.

The application for leave of absence must be submitted to Registrar Services on or before the last day of the quarter (including summer) prior to the quarter for which the student is seeking leave.

-Leaves will be approved only if attending consecutive quarters would present an exceptional hardship or loss of opportunity.

-Students seeking leave for more than one quarter must re-apply each quarter for the following quarter.

Questions can be referred to reg@cwu.edu

Academic Integrity

Actuarial professionals in general, and Credential Actuaries in particular, have reputations for working hard, being objective, and having integrity. Aspiring actuaries (i.e., actuarial students) must:

- Accept these as the Facts of Professional Life and
- Understand that **when one person compromises, all suffer.**

This is especially true with respect to integrity. Consequently, any student guilty of committing a proscribed action under the Student Judicial Code (WAC §106-120-027) will receive **a grade of F** in this course and be subject to further disciplinary action in accordance with University Policy (WAC §106-72-005).

The grading policy for all actuarial courses is based on strict compliance with WAC 106-120---STUDENT JUDICIAL CODE, especially Part II, Sub-part B, regarding ACADEMIC DISHONESTY. A student who violates this Code WILL RECEIVE A GRADE OF F IN THIS CLASS, and will be subject to further disciplinary action in accordance with University Policy (WAC 106-72-005).