CHAPMAN UNIVERSITY
University Honors Program
One University Drive
Orange, CA 92866

COURSE SYLLABUS

HON 350 **Fall 2013**
Scientific Prediction: Information, Technology and Progress

Catalog Description:
Prerequisite: acceptance to the University Honors Program, or consent of instructor.
This course examines the philosophy and techniques for creating forecasts and making predictions. Historical context of prediction is discussed. Qualitative and quantitative techniques are covered. Traditional quantitative methods and probabilistic approaches will be applied. Evaluation of forecast accuracy and its implications are considered. Prediction applications include, but are not limited to economics, science, social science, business, sports and weather. (Offered as needed.) 3 credits.

Course Learning Outcomes:
A student completing this course will be able to:

- Describe and apply basic framework for creating and evaluating predictions and forecasts
- Articulate various perspectives in the philosophy of science as they relate to making predictions
- Describe types of qualitative forecasts and how they are applied
- Describe the elements of time series and causal forecasting techniques and apply these methods to data using software
- Apply mechanisms for evaluating quantitative forecast quality
- Describe probabilistic forecasting techniques and demonstrate the application of Bayes Law
- Apply MS Excel and other tools where necessary to manage data, create models, make forecasts and evaluate forecast quality
- Gather, organize, model, forecast and present defensible forecasts
- Clearly article logical scientific analysis via oral and written means

GE 7QI Learning Outcome:
Applies and analyzes quantitative methods and techniques.
The course will spend a significant percentage of contact hours covering techniques for developing quantitative forecasts.

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Honors Program Learning Outcomes:
Upon completing a course in the University Honors Program students will have:

a. Obtained a starting point for integrative exploration of the development of cultures and intellectual achievements through a variety of disciplinary and interdisciplinary perspectives;
b. Sharpened their ability to critically analyze and synthesize a broad range of knowledge through the study of primary texts and through engagement in active learning with fellow students, faculty, and texts (broadly understood);
c. Understood how to apply more integrative and interdisciplinary forms of understanding in the advancement of knowledge and in addressing complex challenges shaping the world;
d. Developed effective communication skills, specifically in the areas of written and oral exposition and analysis.

To integrate the Honors Program Learning Outcomes, this course focuses on the gains in the field of forecasting over the course of history, but especially over the past 50 years. Students will learn to critically evaluate data and forecasts for effectiveness. They will gain understanding of the value of good forecasts in society. In addition they will present the results of their own forecast experiment to practice

Content:
A student taking this course will develop first a historical context for the evolution of the science of prediction including a brief examination of the philosophy of science itself. In particular initial discussion will focus on the human need to predict the future and the development of science to accomplish this task. The nature of data and tools available before the 20^{th} century will be discussed as a mechanism for providing context on the current significance of change in this arena.

The central focus of the course will start by developing a framework for scientific prediction. Qualitative techniques for arriving at decision making consensus will provide the first examples of forecasting techniques. Developments in data collection, information technologies and tools and mathematical models for making prediction will follow. Students will develop skills in applying frameworks, basic techniques and tools to prediction problems in a variety of disciplines. Significant focus will be placed on basic decision support systems like MS Excel for managing data.

Near the middle to end of the course students will be asked to make and defend forecasts or predictions in a given context of their choosing. Students will be asked to present context, framework, data, rationale for selected model, the forecast and to evaluate the quality of the forecast. Through this activity students will gain an appreciation for the science and art of making predictions and for communicating these results in a convincing manner to the broader audience.

Current Required Texts:
The Signal and the Noise, Nate Silver, The Penguin Press, New York, 2012.

(Other readings to be added)

Instructional strategies:

- The classroom sessions will generally be composed either of "reading and conference" discussions (participation opportunities) or of informal presentations.
- There may also be class activity sessions or outside speakers.
- Assigned reading and assignments.

Methods of Evaluation:
The course will be evaluated in four major areas: participation, homework assignments, a midterm paper and a final report.

Participation: Active student participation during class sessions, and tentatively, at other times, is required in this course. Participation will be assessed as indicated below. Students will be provided with immediate feedback on their participation.

Participation in each class will be scored as follows:
0 – No participation or student did not attend class
1 – Some contribution to class
2 – Competent, prepared and thoughtful contribution to the class

There may be additional opportunities to obtain participation points outside of normal class times. Students may also be alert to class sessions where participation will not be evaluated.

Participation will count for twenty percent (20%) of the overall course evaluation.

Homework: Students will be assigned approximately six homework assignments approximately biweekly to provide insight and practice developments in systems, mathematics, data management and analytical techniques.

Homework assignments may be completed by working together with other students, however the final answers submitted should be your own work. Thirty percent (30%) of the course evaluation will be based on homework assignments.

Course Project: A single project will be assigned during the semester that will account for fifty percent (50%) of the course evaluation. In a nutshell each student will choose a forecasting problem, gather data, establish process, build models, make forecast recommendations and evaluate forecast quality.

Each class member is required make a class presentation regarding their data, process and results of their forecasting exercise. In addition each student will turn in a written report of their forecasting analysis. Students will also provide a formal critique of others' project presentation.

Additional details on the course project will be made available during the class.

Exams: There are no tests or exams in this course.

Final course evaluation will be based on a weighted average of scores on all evaluated work.

The categories and weights are:	Total
Participation	20%
Homework	30%
Course Project	50%
Total	100%

Chapman University Academic Integrity Policy:
The course syllabus should include the following statement:
Chapman University is a community of scholars which emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work, and academic dishonesty of any kind will not be tolerated anywhere in the university

Students with Disabilities Policy:
The course syllabus should include the following statement:
In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to inform the instructor at the beginning of the term. The University, through the Center for Academic Success, will work with the appropriate faculty member who is asked to provide the accommodations for a student in determining what accommodations are suitable based on the documentation and the individual student needs. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Prepared by: Ken Murphy
Fall 2013

Last revised: