**Applied Economic Forecasting**

Department of Agricultural and Applied Economics

Virginia Tech

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**Instructor**: Shamar Stewart

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**Office Hours:** 2:00pm-3:30pm, Mondays & Wednesdays or by Appointments

**Lecture Time:** 3:30pm-4:45pm, Mondays and Wednesdays, Hutcheson Hall

**Course Description**

Forecasting the future economic conditions is a fundamental aspect of decision making in any business or government. Since economic and business conditions vary over time, business and government leaders must constantly (re)evaluate how such changes will impact their operations. Therefore, comprehensive knowledge of the forecasting process is necessary and vital.

Nowadays, forecasting is a technical field, and as such, it requires some mathematics and statistics knowledge. This course is designed to cover the forecasting process and techniques in order to equip you with such skills in real-world. This course is especially useful in forecasting business time series such as sales, expenditures, and macroeconomic variables such as GDP, interest rates, inflation, stock market, etc. In short, this course covers the basics of forecasting and time series analysis as used in finance, economics and business.

We will first start with econometric theories behind the techniques. You will learn how to examine the data and how to prepare data prior to forecasting. Various useful forecasting techniques will be introduced to improve the quality of forecasting. Time series topics will include linear regression, ARIMA models, trend modeling, seasonal adjustments, etc. With an emphasis on applications, this course will devote a significant amount of time to walk through applying these techniques to analyze micro and macro data.

**Course Objectives**

**Upon successful completion of this course, students should be able to:**

* formulate and specify basic forecasting models.
* collect, interpret, and analyze data by building forecasting models.
* apply fundamental statistical and probability concepts used in forecasting.
* appreciate the existence of a hierarchy of forecasting models.
* use econometric software.
* graphically examine Time Series Data: trend, seasonal, cyclical, and irregular components.
* evaluate forecasting accuracies of competing forecasting methods.
* form efficient “combination” forecasts
* recognize that market analysis is a combination of science and art; i.e. effective market analysis requires knowledge of scientific techniques as much as human judgment based on institutional understanding about markets.

**Textbooks (TENTATIVE)**

Business Forecasting, 9e, by John E. Hanke, Dean W. Wichern (Required)

Forecasting: Principles and Practice by Rob J. Hyndman and George Athanasopoulos. (Required)

* This book is available for free at <http://otexts.com/fpp/>

Forecasting for Economics and Business, by Gloria Gonzalez-Rivera (Supplemental)

**Prerequisite**

This course is accessible to all students with a basic background in algebra, statistics, and linear regression. A brief review of fundamental statistical concepts will be provided.

**Grades**

Your grade consists of weekly assignments, two midterms and a final exam distributed as follows:

|  |  |
| --- | --- |
| **Assignments and Exams** | **Weights** |
| Weekly Assignments | 35% |
| Midterm I | 20% |
| Midterm II | 20% |
| Final exam | 25% |

Your letter grades will be assigned as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A >= 93 | A- 90-92 | B+ 87-89 | B 83-86 | B- 80-82 | C+ 77-79 |
| C 73-76 | C- 70-72 | D+ 67-69 | D 63-66 | D- 60-62 | F <60 |
|  |  |  |  |  |  |

**I will ROUND UP your final grades but please do not anticipate any further grade adjustments!**

**Assignments (TENTATIVE)**

You should expect weekly assignments during the semester. The assignments are mostly empirical and practical for solving problems.

The assignments are given on CANVAS and you are required to submit your answers electronically on CANVAS as well. The due date of each assignment will be given at the time when the assignment is announced. A late assignment is ***NOT ACCEPTABLE***, and will receive a 0.

Group study and discussion for assignments are highly encouraged. However, each student must independently write his/her own solutions for turning in. The honor code is fully enforced and **all** students who resort to submitting “copycat” assignments will receive a zero for the assignment.

**Software**

Econometric analyses will be done in R. This statistical software may be downloaded for free by going to <https://www.r-project.org/>. Also, we will use the R studio interface available at <https://www.rstudio.com/>.

**Attendance and Participation**

I do not have a mandatory attendance requirement for this class. You are responsible for your own success, and failure, in this course. In my experience, and studies would prove, there is a high correlation between students’ attending classes regularly and performing well in university courses.

Students need to be active participants in this course. This involves attending classes regularly, asking and answering questions, and participating in class discussions. It is your responsibility to obtain any handouts, assignments or information announced during a missed class period. Any student who is unable to attend class regularly, regardless of the reason or circumstance, should withdraw from the class before poor attendance interferes with his/her ability to achieve the course objectives. ***Students are strongly advised to set up office hours appointments, the moment they sense that they are falling behind and need help understanding the material.***

**Lab Sessions (Tentative)**

Language towards labs will be included here.

**Course Outline**

The following course outline is tentative and subject to changes based on the pace of the course. All the changes will be duly informed in class.

|  |  |
| --- | --- |
| **Date** | **Topic** |
| TBD | Intro to Forecasting |
| TBD | Review of Basic Statistical Concepts |
| TBD | Exploring Data Patterns and Intro to Forecasting Techniques |
| TBD | Moving Averages and Smoothing Methods |
| TBD | **Midterm 1** |
| TBD | Time Series and Their Components |
| TBD | Simple Linear Regression |
| TBD | Multiple Regression Analysis |
| TBD | **Midterm 2** |
| TBD | Regression with Time Series Data |
| TBD | Box-Jenkins (ARIMA) Methodology |
| TBD | Forecasting with a system of equations: Vector Autoregressions |
| TBD | Forecasting Volatility: ARCH and GARCH Models |
| TBD | Forecasting with Nonlinear Models: An Introduction |
| TBD | **Final Exam** |