

## **BUS 235F\_ Business Forecasting**

**Fall 2022**

### **Course and Contact Information**

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Office Hours:	Tuesdays 15:00-16:15 PM
Prerequisites:	BUS 90

### **Course Description**

This course aims at a comprehensive introduction of forecasting methods and their applications in business to students. The course will be heavily weighted toward applied work and has a very limited introduction to the mathematical theory behind the methods. Students will have a portfolio of forecasting methods at the end of the course to demonstrate competence.

### **Lucas College and Graduate School of Business – Vision and Mission**

***Vision:** Our College powers Silicon Valley by serving the global and diverse demands of this dynamic and innovative business environment. We provide a 21st century education to enable the success of our students, employers, and the community.*

***Mission:** We are the institution of opportunity in Silicon Valley, educating future leaders through experiential learning and character development in a global business community and by conducting research that contributes to business theory, practice and education.*

### **MBA Program Learning Goals**

(Not all Program Learning Goals are covered in every course)

#### **Goal One: Business Concepts**

Demonstrate knowledge of key business functions and the technologies that enable them.

#### **Goal Two: Analysis and Decision Making**

Apply analytical models and data-driven methods for making business decisions.

**Goal Three: Cultural and Global Awareness**

3a. Evaluate the benefits and complexities of cultural diversity.

3b. Develop strategies for organizations to adapt to global and social changes.

**Goal Four: Ethical Management**

Develop ethical managerial decisions that consider all stakeholders.

**Goal Five: Leadership and Team Skills**

Identify factors that contribute to effective leadership and demonstrate the skills and behaviors necessary to be a productive team member.

**Goal Six: Innovative and Strategic Thinking**

Integrate knowledge and formulate strategies to deliver value to customers and society.

**Goal Seven: Communication Skills**

Deliver effective oral and written communications in the digital era.

**Course Learning Outcomes (CLO)**

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

1. Recognize patterns in time series data.
2. Exploit the patterns in time series to make short-term forecasts.
3. Use fable package in R to apply different forecasting methods to time series data.

**Course Format**

This course takes place on Canvas, accessible through <http://one.sjsu.edu/> or <http://sjsu.instructure.com/>. Course materials such as syllabus, notes, assignments, etc. will be posted on the Canvas. You are responsible for regularly checking Canvas to learn of any updates.

**Required Texts/Readings**

**Textbook**

*Forecasting Principles and Practice (3<sup>rd</sup> ed)* by Rob J Hyndman and George Athanasopoulos. The textbook is available for free online at <https://otexts.com/fpp3/>

**Other Readings**

We will be using the R statistical software package. The course will introduce fable package in R and cover the details of using R to perform the specific forecasting techniques we will learn. There is much more to R than we will cover, and if you would like to dig deeper or gain a broader understanding of R, there are many free resources online and on LinkedIn Learning

## Course Requirements and Assignments

The course grade will be based on weekly homework assignments (50%), a final project (40%), and class participation (10%). The schedule of due dates can be found at the end of the syllabus.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

You may work on the **homework** individually or with one partner. If you work with a partner, *one* of you should turn in the assignment with *both* of your names on it. Include your names at the beginning of the homework document.

Homework will be due at 11pm on Sunday at the end of each week when assigned and should be turned in through Canvas. I monitor the class discussion list to answer questions most actively on weekdays, so I encourage you to start the homework during the week if your schedule permits. I will also monitor the class discussion over the weekend, but not as frequently. If you know in advance that you will have difficulty turning in an assignment on time please notify me as soon as possible.

A **project** will be due at the end of the course. For the project you will form a team of your choosing with three other students (four team members all together). You will apply the methods you learn in class to perform forecasting on a data set of your choice. You are welcome to organize your own group or use the Discussion on Canvas to look for group members.

Your project will have deliverables throughout the 8-weeks, with a final report due at the end. The deliverables are:

1. Choose a data set and form a group. (10 points)
2. Load the data set into R and provide summaries of the columns in the data. (10 points)
3. Apply one method from class to the data and report its performance. (10 points)
4. Final report. (70 points)

Your final report should be 10-15 pages, including figures. It should include a citation of where the data was obtained from and an appendix with all of the R code used to produce the report (not counted toward the page limit). No R code should appear in the main body of the report. No raw output from the R console should appear in the main body of the report. Any tabular data or output that you want to present should be formatted presentably. Tables and graphs should be carefully labeled and sized appropriately so that they are legible. Nothing should be in the appendix except the R code.

The work that you do for Deliverables 2 and 3 may be re-used and appear in your final report, though it is not required to (for example, if you want to improve on them or adjust your analysis).

The final report will be graded out of 70 points, broken down as follows:

- Provide an overview of the data and what you are trying to do with the data. Provide enough background for the reader to make sense of the data. If the data set includes any specialized vocabulary or jargon, explain it in plain English. (10 points)
- Apply all applicable methods from class. (30 points)
- Compare the performance of the methods and make a recommendation of what method should be used in practice. (10 points)
- Describe what business insights you have gained about the data. (10 points)
- Write clearly, with proper grammar. Organize the paper logically. Adhere to the page limit and guidelines above. Include a complete and accurate code listing in the appendix. (10 points)

**Participation** is worth 10% of your grade. I've set the bar low for obtaining full participation points: you must ask or answer five questions on the discussion list over the course of the class. Each question you ask or answer will be worth 2 points, up to a maximum of a full 10 points towards your participation score. If you don't have any questions, you may also post links to relevant material that you find online (such as news articles about companies using forecasting, tutorials that you found helpful, etc.). Of course, I encourage you to participate more than that, and expect many of you will contribute much more than five posts. Posts to say "thank you" when someone helps you are definitely encouraged, but won't count towards the participation score.

### Grading Information

Course grades will be assigned based on the following cutoffs:

Grade	Percentage
A plus	98 to 100%
A	94 to 97%
A minus	90 to 93%
B plus	86 to 89%
B	83 to 85%
B minus	80 to 82%
C plus	76 to 79%
C	73 to 75%
C minus	70 to 72%
D plus	66 to 69%
D	63 to 65%
D minus	60 to 62%
F	Below 60

For more information, check:

- [University Attendance and Participation Policy F15-12 \(http://www.sjsu.edu/senate/docs/F15-12.pdf\)](http://www.sjsu.edu/senate/docs/F15-12.pdf)
- [University Grading System Policy F18-5 \(https://www.sjsu.edu/senate/docs/F18-5.pdf\)](https://www.sjsu.edu/senate/docs/F18-5.pdf)
- [University Syllabus Policy S16-9 \(http://www.sjsu.edu/senate/docs/S16-9.pdf\)](http://www.sjsu.edu/senate/docs/S16-9.pdf)

### Classroom Protocol

Your command of the forecasting techniques and the development of critical thinking skills will be facilitated in the context of online screencasts and online discussions. Online screencasts will consist of lectures that introduce concepts and workshops that demonstrate how to use R to apply forecasting methods. Discussions

will be conducted asynchronously on Canvas. You are expected to contribute your answers, thoughts, and questions and engage with your classmates in a civilized but intellectually rigorous discussion.

**University Policies (Required)**

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](#) at <http://www.sjsu.edu/gup/syllabusinfo/>.

## BUS 235F\_ Business Forecasting

### Course Schedule

#### Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1		<p><b>Getting Started with R, Basic Concepts of Forecasting, and Time series graphics</b></p> <p>Read the syllabus            Read Chapters 1 and 2            Watch the lecture videos            Install R and R Studio  <b>Turn in Homework 1</b></p>
2		<p><b>Time Series Decomposition</b></p> <p>Read Chapter 3            Watch the lecture videos  <b>Turn in Homework 2</b>  <b>Post Final Project plan and group members (Project Deliverable 1)</b></p>
3		<p><b>Time Series Features and forecasting toolbox</b></p> <p>Read Chapter 4 and 5            Watch the lecture videos  <b>Turn in Homework 3</b></p>
4		<p><b>Time series regression models and Exponential Smoothing</b></p> <p>Read Chapter 7 and 8            Watch the lecture videos  <b>Turn in Homework 4</b>  <b>Turn in Project Deliverable 2</b></p>
5		<p><b>ARIMA Models</b></p> <p>Read Chapter 9            Watch the lecture videos  <b>Turn in Homework 5</b></p>
6		<p><b>ARIMA Model</b></p> <p>Read Chapter 9            Watch the lecture videos  <b>Turn in Homework 6</b>  <b>Turn in Project Deliverable 3</b></p>
7		<p><b>Neural Nets, Bagging and Boosting, Nowcasting</b></p> <p>Read Chapter 12</p>

		Watch the lecture videos <b>Turn in Homework 7</b>
8		<b>Additional topics</b> Watch the lecture videos <b>Turn in Final Project</b>