BANA/ECON 4365: INTRODUCTION TO BUSINESS FORECASTING

Fall 2017

| Instructor: | Dr. Kevin Henning | Time/Place: | Online |
|-------------|-------------------------------------|-------------|-----------------------|
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Prerequisites: ECON 2301, ECON 2302, and BANA 3363

Office Hours: Monday, 12:30 p.m. - 2:00 p.m. in Huntsville; Tuesday, 4:30 p.m. - 6:00 p.m. at The Woodlands Center; and by appointment (either in person, over video conferencing [such as Blackboard Collaborate], or by phone).

Required Materials:

- Ord, K. and Fildes, R. (2013). *Principles of Business Forecasting*. Mason, OH: Southwestern Cengage Learning. We will be using the e-book available at https://bookshelf.vitalsource.com/#/books/9781133712695. You will need to set up an account before you can purchase the book.
- Real Statistics, a free add-in that works with PC and Mac versions of Excel. This software will allow us to perform calculations far more quickly and easily than the "out of the box" version of Excel. The software is available from http://www.real-statistics.com/free-download/real-statistics-resource-pack/. Instructions for installing this specialized software will be given at the beginning of the semester, and instructions on how to use it to accomplish specific analysis objectives will be presented as we go. It is **your responsibility** to ask me questions any time you encounter an issue with the software or have a question about how to use it in an assignment (see below).
- A working computer and a reliable high-speed internet connection. Detailed information on system requirements can be found at online.shsu.edu/campus/support-desk/system-requirements.html.

Course Description and Objectives: In today's highly competitive business environment, making good decisions about future events (sales, expenses, production, inventory, employee recruitment, etc.) is vital to success. Forecasting is used in all areas of business, and companies that do not implement sound forecasting methods will find themselves at a severe disadvantage compared to companies that do. As a business professional (whether you become a "forecaster" or not), you will need to understand the basic methods and tools used to generate forecasts. This course in applied business forecasting will discuss how forecasts are developed and implemented in practice.

We will study quantitative techniques such as moving averages, exponential smoothing, time series decomposition, regression analysis, and ARIMA, with an emphasis on applying the methods using software rather than deriving them theoretically. Some theory, however, is required to understand when and how to apply the methods, so you should be prepared to draw upon the quantitative skills you have learned in previous BANA courses. Although our focus will be on quantitative methods, we will not lose sight of the important subjective–or qualitative–element that must accompany any forecast presented to managers, shareholders, employees, and/or the general public. In general, emphasis will be placed on communication of the ideas behind the forecasting method(s) employed, not on simple "number crunching."

Over the course of the semester, attentive students will:

- 1. Understand the role of forecasting in the business world [COBA3, ECON2]
- 2. Learn about qualitative and quantitative forecasting methods using real data sets [COBA1, ECON2]
- 3. Understand the significance of data analysis and model selection criteria in the context of business forecasting [COBA3, ECON2]
- 4. Have acquired practical knowledge of computer-based statistical analysis and forecasting software [COBA1, COBA4, ECON2]
- 5. Have developed and presented a complete business forecast using real data [COBA1, COBA2, COBA4, ECON2]

The COBA and ECON codes refer to course learning objectives that address the College of Business learning objectives and economics major objectives, respectively.

Organization and Delivery of Course Content: The following information will tell you a little bit about what you can expect from the course so that you can start out in the best possible way.

- This course uses the usual Blackboard learning management system to deliver content. The material for the course is organized into content folders by topic rather than book chapter. Each content folder contains background reading material (PowerPoint slides, handouts, links to relevant websites, etc.), lecture videos, and graded homework assignments (see the discussion under "Blackboard Assignments" below).
- This course is not completely self-paced. Exams and assignments will open and close at certain times for everyone, and some group work is required (more details are given below).
- Although there will be many new topics in this course, we will at times need to draw upon the concepts in the prerequisite courses, in particular, BANA 3363. Brief reviews of key concepts from these courses will be provided when topics in the course call for them. How challenging you will find the course overall will depend and your individual learning style and how challenging you found the prerequisite courses. Reading the course material and watching the lecture videos will be essential activities for most students in the course.
- To balance out the additional challenge the course offers (if any), I will devote a large amount of time toward being actively involved in the course and accessible through email, discussion board postings, and frequent announcements on the course Blackboard page. I am not a "set it and forget it" instructor.
- There is a lot of information about forecasting on the internet; no big surprise there. However, this is not a "Google Your Way to an A" course. A significant amount of material is of my own creation. Spending large amounts of time on "homework help" websites looking for the answers will not be a good idea. For one, you will not learn the additional skills that this course will allow you to add to your resume. Secondly, "the answers" are probably not on those websites. Your best bet is to ask me questions in the course discussion board (see below).

- The purpose of the course is to give you useful skills in data analysis that can give you an additional competitive edge in the job market. Constructive feedback is always welcome! By "constructive," I mean **specific, reasonable** suggestions about aspects of the course you find useful and those that can be improved. Comments such as "Give less work" or "Explain [whatever topic] better" don't give me enough information to make improvements: What, *specifically*, turned out to be too much work? What, *specifically*, about [whatever topic] did you have difficulty with?
- Through analyzing student feedback in online classes over the years, I have come up with the following list of suggestions:
 - Don't panic at the amount of material that is covered! Take things one step at a time, asking questions along the way. Keep in mind that the course, if offered face-to-face, would have two 80-minute class periods per week.
 - Lecture videos are meant to give you the same course material as you would get in a regular weekly face-to-face setting. Try setting aside a specific time and/or place to watch the videos each week so that you get into a routine.
 - If you have had a statistics course recently, or the material in a video feels familiar, try skipping ahead to a segment in which I work problems to see if you can follow me. If not, then watch earlier segments of the video.
 - I suggest first opening each assignment when it becomes available and printing it out so that you can identify key parts of the lectures. Working out the calculations on paper and then inputting them into Blackboard is more effective for some students.
 - Take breaks. Most videos are broken up into at least three segments. Don't watch the video all at once. Watch one segment, go do something else, and then come back and watch another.
 - Ask questions early and often through the discussion board (see below). By its nature, a quantitative course like forecasting builds upon itself. If you are unsure of the concepts discussed early on and do not seek help, you will have trouble understanding later material. Conversely, if you have a solid understanding of the basic concepts, you will likely find the later material to be easier.

Technical Support Information: As with any online resource, Blackboard doesn't work perfectly all the time. But the problems are usually minor, temporary, and easy to work around. If you encounter any technical problems with submitting an assignment or with any other aspect of course functionality, please <u>do not contact</u> <u>me until you have contacted the SHSU Online Support Desk</u> at 936-294-2780, or blackboard@shsu.edu (otherwise, I will always just tell you to contact them first anyway, so save the time and do so). Hours of operation and other information can be found at online.shsu.edu/campus/support-desk/index.html. Note that SHSU Online does not provide tutoring services and is not responsible for course policies, due dates, organization, or content. Questions regarding these items should be directed to the instructor.

If you are unable to solve the problem with the support technicians, ask them to give you a case/incident number and **then** contact me so that I can verify your issue and, if needed, discuss it with SHSU Online.

Grading: Your grade will be a weighted average of the items in the following table. **I do not use Blackboard's point system!** Information about each item appears after the table.

| Component | Weight |
|---------------------------------|--------|
| Two (2) exams | 40% |
| Individual homework assignments | 20% |
| Forecasting Group Project | 35% |
| Work group peer evaluation | 5% |

The cutoffs for letter grades are as follows: 90-100-A; 80-89-B; 70-79-C; 60-69-D; 59 and below-F.

Exams: In calculating your final grade, I will weight each exam according to your performance on it. The highest exam will be weighted 25% and the lowest exam will be weighted 15%. The first exam will be taken approximately halfway through the course and will serve as the midterm. The second exam will be taken during the final exam period (see the schedule below). However, for grading purposes the second exam will be treated as just another exam.

Exams must be taken at the day and time (or, for online classes, during the window of time) listed in the syllabus unless the absence arises from any of the following activities:

- documented, legitimate school-sponsored or career-related activities (job fairs, work emergencies, etc.)
- observances of religious holy days (see below)
- other *emergencies* (hospitalizations, funerals, child care issues, major accidents, court dates, jury duty, deployments etc.) Vacations, honeymoons, cruises, extended happy hours, etc. *do not* constitute emergencies.

If you miss an exam due to one of these reasons, you must contact me within two (2) calendar days of the absence to see what documentation you need to show me to excuse the absence. For example, acceptable documentation for a medical emergency is a letter from a licensed medical professional on his or her practice or group letterhead explaining why you are unable to take the exam as scheduled. For other emergencies, please speak with me about what forms of documentation I require. Failure to contact me within the above time window will result in a grade of zero (0) on the exam, with no possibility to make up the grade. No exams will be dropped for any reason.

Individual Homework Assignments: Corresponding to each course folder in Blackboard will be a graded assignment that is intended to give you practice with the key forecasting concepts. Some questions will cover

the underlying concepts of the various techniques we discuss, while others will give you practice using Excel and/or the Real Statistics add-in (see "Required Materials" above) to perform realistic forecasting tasks.

ASSIGNMENT GUIDELINES:

- These assignments are not actual tests. Even though Blackboard calls them "tests," they are homework. Feel free to consult me, your classmates, tutors, and study partners for help. Be aware, though, that on many problems, the numbers or answer choices will be different for each student. Therefore, copying off of another student's assignment will result in a bad grade. In addition, you will encounter problems like those in the assignments on exams, so you will need to understand how to work all of the problems.
- In the calculation of your final grade, I will drop your single lowest/missing homework grade. Therefore, no make-ups will be allowed on the assignments for any reason. The missed assignment will simply count as the dropped one with no effect on your final grade. Additional missed assignments will count against your final grade.
- You can go in and out of each homework assignment as many times as you want. In addition, there is no time limit other than the due date. Therefore, you can work each assignment a little at a time (this is the approach I recommend).
- Many students find that printing out the assignments before working them helps them focus on the key components of the video lectures.
- A portion of the assignment grade will be based on how well you communicate your findings and conclusions. Getting the numerical answers right is NOT enough. It is much more important that you understand the concepts that result in those numeric answers. This means that answers to questions should be written using complete, grammatically correct sentences. When in doubt, err on the side of explaining too much rather than explaining too little. Additional guidelines for completing assignments will be provided as needed.
- Assignments must be submitted electronically through the Blackboard Assignment system. Typically, you will need to upload one or more Excel spreadsheets. I <u>will not</u> accept assignments sent via email, fax, or hard copy; if you are having difficulty submitting your work through Blackboard, please ask for assistance.
- Assignments will be automatically scanned for plagiarism from other papers in the class, from outside sources, and from papers submitted by students in previous semesters. If you choose to incorporate outside elements into your work-thoughts, facts, opinions, graphs, images, tables, or any other material that is not your original creation-you **must provide a full citation of the original source using American Psychological Association (APA) format.** An excellent online resource is the Purdue Online Writing Lab (OWL) found at owl.english.purdue.edu/owl/resource/560/01/. Failure to cite the sources you use **constitutes plagiarism**, a serious academic offense with a penalty ranging from a significant deduction of points on the assignment up to failure of the course. Therefore, err on the side of caution: when in doubt, if you used someone else's ideas or words, include a citation. However...
- Unless an assignment specifically calls for outside sources, I **do not** expect you to include them. For cases in which citing sources *is* required, **you may not** cite any material from "homework help" websites such as Chegg, or articles in Wikipedia; you **can** use Wikipedia to find outside sources, however.)

• Blackboard sometimes experiences technical problems. If you are having difficulty submitting an online assignment, or have a technical question contact SHSU Online support (see above).

Group Project: The best way to learn forecasting is to do forecasting. Thus, one of the course requirements is a semester-long project that will give you the opportunity to work collaboratively in a group of three (3) to four (4) persons to produce a forecast of some economic variable Y_t . The project will be broken up into several graded parts so that you have sufficient time to adjust your variables and forecasts accordingly. The final deliverable will be a recorded PowerPoint presentation to the rest of the class and a written report. Details on the semester project will be available in a separate document on Blackboard in a few days. In the meantime, however, if you want to get a feel for the kinds of data that are acceptable for the project, take a look at the Statista database available on the SHSU library website: shsulibraryguides.org/az.php?t=3206

PROJECT GROUPS: As mentioned above, the project will be completed in groups of three (3) to four (4) students. If your group size drops below three (3) due to students withdrawing from the course, I reserve the right to move the remaining members into existing groups or form new groups, as needed, so that all teams consist of at least three people. If a team member drops late in the course, after significant work has been done toward the project by the remaining group members, groups of two will be allowed.

Teamwork in an online setting can sometimes be challenging, but there are many free resources that make collaboration easier. I recommend Google Hangouts (hangouts.google.com/), which only requires an active Gmail account. A particularly useful feature of Google Hangouts is the ability to share your screen view with everyone in your group simultaneously, thereby making it easier for everyone to contribute to the assignment. I recommend using Hangouts with Google Drive (accessible from your Gmail account) to help with the sharing and editing of a single document among several users.

Most of the time, members of a group in a senior level course are motivated and mature enough to work together productively, accommodating one another's schedules and resolving minor disputes. In extreme cases of group dysfunction, however, I am willing to help resolve the dispute, but you <u>must bring the problem to</u> <u>my attention; the earlier, the better.</u> I do not regularly monitor the activities of the groups, and will take the default stance of "everything's okay" unless you tell me otherwise. When bringing a group conflict to my attention, you need to demonstrate (e.g., using copies of emails or a discussion of specific incidents) that your group is unable to work with the person in question. In some cases, I will allow a group to "fire" the individual causing the disruption. In most other cases, you should find the work group peer evaluation (see below) sufficient to account for variation in group member effort.

Peer Evaluation Assignment: After the final project has been submitted, you will have the opportunity to evaluate yourself and the other members of your work group on the degree and quality of the work performed on the project. Each person in the group will have [group size] $\times 5$ points (in increments of 0.5) to allocate any way he or she sees fit. A student's final participation grade is the percentage of the maximum possible points that student has been assigned by all team members.

An example of equal allocation (the ideal case) for a group of 3 is given below. Alice, Bill, and Charlie all agree that everyone participated equally over the semester.

| Equal Allocation (Ideal) | Alice | Bill | Charlie |
|--|-------|------|---------|
| Alice | 5 | 5 | 5 |
| Bill | 5 | 5 | 5 |
| Charlie | 5 | 5 | 5 |
| Total | 15 | 15 | 15 |
| Grade $\left[=\frac{\text{Column Sum}}{15} \times 100\right]$ | 100 | 100 | 100 |

Here is an example of unequal allocation, in which Alice believes Bill did not do his fair share of the work but Bill thinks that he and Charlie both did their fair share. Further, Charlie thinks that Alice did not do her fair share. Notice the rows still total to 15.

| Unequal Allocation | Alice | Bill | Charlie |
|--|-------|------|---------|
| Alice | 8 | 2 | 5 |
| Bill | 5 | 5 | 5 |
| Charlie | 1 | 5 | 9 |
| Total | 14 | 12 | 19 |
| Grade $\left[=\frac{\text{Column Sum}}{15} \times 100\right]$ | 93 | 80 | 127 |

The work group evaluation portion of the final grade should, ideally, be an "easy 100" because by the time of the evaluation (at the end of the semester), you should have either worked to resolve any disputes or, for extreme cases, contacted me for assistance in these matters (see "PROJECT GROUPS" above for more details). However, please feel free to use this tool to assign participation points to your group as you see fit.

Communication Expectation: Oftentimes, there are many ways that an instructor can discuss a concept or frame a problem, and how I present something in a lecture may leave you with several questions. In a face-to-face course, you could simply raise your hand or speak to me after class. In an online class, you are responsible for asking for help when you need it. That is, <u>I expect you to ask me questions!</u> It is almost a guarantee that several other students will have the same question as you do on any given topic.

To ensure that your questions are answered as quickly and efficiently as possible, if you cannot meet with me in person during office hours or over the phone or video conference, follow the guidelines below:

• If your question **only pertains to you** (such as a question about your grades, attendance/course activity, an emergency, or some other personal matter relevant only to your individual performance in the course),

and it is not related to a technical problem in Blackboard, email or call me using the contact information on the first page of the syllabus.

- If you are having trouble accessing Blackboard, viewing or opening an assignment or test, accessing your grades, or experiencing any other technical problem, contact the SHSU Online Support Desk using the contact information above. They will inform you if you need to contact me.
- If your question involves the course content (such as how to think about a problem, a concept you don't understand, a course policy or deadline, how to do something with the software, or any other general-interest question), log into the Blackboard page for this course at blackboard.shsu.edu and post your question in the "Questions for the Instructor" discussion board forum (I don't monitor any other forums). I will answer discussion board questions within 24 hours on weekdays and within 48 hours on weekends. Therefore, do not wait until the last minute before something is due to ask a question.

Here are some guidelines for asking content-related questions:

- Do not simply ask if your answer to a problem is right or not. You need to show or explain in your post everything you did up to the point you are unsure of. Concepts are vastly more important than calculations, and you have to give me a place to start.

For example, "Is the correct answer to Problem #6 2.4?" is a **BAD question** because it doesn't indicate your thought process. Writing "On Problem 6, it looks like I need to find the average. I found the average by taking (2.1+3.6+1.3+2.6)/4. Is that the right approach?" is better.

- When asking for help on a problem, **provide the full text of the question**. I don't have every word of every problem of every assignment in my head at all times (but I'm flattered some students think I do).

For example, don't simply say "I need help with #12." What #12 are you talking about, and what about #12 do you have a question over? Give me details. Say something like "I need help with Question 12 on Assignment 3," and then provide the **full text of the question** and what specific part you need help with.

Remember, ask questions when you do not understand something. The earlier the better.

Extra Credit: One (1) point of extra credit on the highest-weighted exam (up to a maximum score of 105) will be awarded for each mistake found in any course material created by me that is brought to my attention via email. A "mistake" is any grammatical, typographical, mathematical, or factual error. A student may earn up to ten (10) extra credit points in a semester. In the event of multiple reports of the same mistake, I will determine which student gets the points by the time stamp on his/her email. (If you are reading this for the first time at the end of the semester in desperate need of points, all I can say is: oops...). Reports of mistakes in material not created by me (e.g., typos in a textbook or errors in outside reading material that you encounter) do not count toward the 10 points, but are greatly appreciated.

Other extra credit opportunities or points may be assigned to the class at my discretion. Any such extra credit assignment will be made available to the entire class. No individual extra credit assignments will

be offered. In addition, if you have not done all of the "regular credit" assignments, you are not eligible for any extra credit.

Academic Dishonesty: SHSU expects all students to engage in academic pursuits in a manner that is above reproach, and to maintain complete honesty and integrity in academic experiences both in and out of the classroom. The University and its official representatives, acting in accordance with Subsection 5.32 of Academic Policy Statement 810213, may initiate disciplinary proceedings against a student accused of any form of academic dishonesty or cheating. "Cheating" includes, but is not limited to:

- Copying from another student's test paper, laboratory or other report, computer files, data listings, and/or programs;
- Using, during a test, materials not authorized by the instructor, including "homework help" websites, discussion boards, and chat rooms;
- Collaborating, without authorization, with another person during an examination or in preparing academic work;
- Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an unadministered test;
- Substituting for another student, permitting any other person, or, otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit, placement, or qualification. For face-to-face classes, this includes signing an attendance sheet for someone else!
- Bribing another person to obtain an unadministered test or information about an unadministered test;
- Purchasing, or otherwise acquiring and submitting as one's own work, any research paper or other writing assignment prepared by an individual or firm.

"Plagiarism" means the appropriation and the unacknowledged incorporation of another's work or idea into one's own work. In other words, if you use another person's words, ideas, or artwork and do not clearly indicate in your paper that you have done so (such as with a reference in a standard citation format) you have committed plagiarism.

Penalties for violations of the above policies include, but are not limited to, a significant grade deduction on the assignment, a zero for the assignment, or a failing grade in the course. If I believe that additional disciplinary action is necessary, as in the case of flagrant or repeated violations, the case may be referred to the Dean of Student Life or a designated appointee for further action. If the student involved does not accept my decision, the student may appeal to the chair of the appropriate academic department/school, seeking reversal of the faculty member's decision.

These and other academic policies may be found at shsu.edu/dept/academic-affairs/aps/aps-students.html

Course Access Expectation: Because of the mathematical content in the course, **you will almost cer-tainly fall behind if you do not regularly log into the course.** I refer all students who do not log into Blackboard regularly to the Sam Houston State First Alert service. Personnel from that office assemble a file on the student and attempt to contact him or her by telephone, email, and regular mail to determine the reason for the lack of activity.

ADA Accommodations: It is the policy of Sam Houston State University ("University") that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the University. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the University policy, see https://www.see.shsu.edu/dotAsset/7ff819c3-39f3-491d-b688-db5a330ced92.pdf

Student Observance of Religious Holy Days: Section 51.911 (b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to make up an examination or complete an assignment from which the student is excused within a reasonable time after the absence. "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20, United States Tax Code.

If you do not inform me of upcoming absences related to this policy, I reserve the right to enforce the standard late work and make-up policies (that is, no late work or make-up work accepted).

Tentative Course Outline: This is an **approximate** schedule to give you an overview of the course. Keep the following in mind:

- I reserve the right to make small adjustments in course content to keep us on track. However, you will never have to turn in something earlier than what is stated in the syllabus.
- Due dates for the two exams, the individual homework ("HWK") assignments, and the project components are given in bold; all due times are 11:59 p.m. central time. Readings are chapters in the forecasting textbook (see "Required Materials" above), and are given as [Chapter#].[Section#].[Subsection#]. For example, a reading assignment given as "3.4.1" would indicate you should read what is in Chapter 3, Section 4, Subsection 1. A reading assignment given as "3.4.2 3.4.3" would indicate that you should read Chapter 3 Section 4, from Subsection 2 to Subsection 3.
- If subsections are not listed, read all of the subsections in that section. For example, a reading given as "3.4 3.6" would indicate you should read everything from Section 3.4 to Section 3.6.
- The order in which the readings are listed is the order in which you should read the material. Sometimes you will see a later chapter listed before an earlier one; that means that you should read the material in the later chapter before the earlier one.

| Week of | Topics | Textbook Reading |
|---------|--|-----------------------------------|
| 8/21 | review the syllabus; install Real Statistics Excel add-in; overview of forecasting | 1.1-1.5 |
| 8/28 | types of data; preparing data using software (graphical and nu- meric descriptive statistics; adjusting for inflation); time series concepts (trends, seasonality, cycles) | 2.1 - 2.5; 4.1 |
| 9/4 | review of some BANA 3363 topics (probability; expected value; normal distribution; sampling distributions; confidence intervals; hypothesis tests) | Appendix A.1-A.5 & provided notes |
| 9/11 | forecasts based on differencing; moving averages (simple & weighted); simple exponential smoothing; Project Part 1 (Proposal) due Sunday, $9/10$ | 2.6; 3.2.2; 3.3 |
| 9/18 | forecast accuracy; prediction intervals for simple methods; Holt's method (the textbook calls it "linear exponential smoothing"); HWK 1 due Sunday, $9/17$ | 2.7; 2.8; 3.4 |
| 9/25 | Holt-Winters method (additive & multiplicative); decomposition; Project Part 2 (Simple Forecasting) due Sunday, 9/24 | 4.4; 4.6 |
| 10/2 | forecasting with regression in Excel (correlation and the regression model; ordinary least squares; forecasting simple trends); | 7.1 - 7.2; 3.1.1 |
| 10/9 | Exam 1 opens at 12 p.m. on Thursday, $10/12$, and closes Saturday, $10/14$, at 11:59 p.m.; continue forecasting with re- gression (using one external X variable; confidence intervals & tests for coefficients; autocorrelation) | 7.4-7.6; 6.1; Appendix 8A |
| 10/16 | continue forecasting with regression (multiple regression) | 8.1-8.6; |
| 10/23 | continue forecasting with regression (indicator variables; transformations; multicollinearity; non-linear models); HWK 2 due Sunday, $10/22$ | 9.1; 9.5; 9.7; |
| 10/30 | ARMA model basics (notation; autoregressive models; moving average models); Project Part 3 (Regression Forecasting) due Sunday, 10/29 | 6.2-6.3.2 |
| 11/6 | fitting ARMA models using Excel; examining model fit; examining stationarity; HWK 3 due Sunday , 11/5 | 6.3.3-6.4 |
| 11/13 | continue fitting ARMA models (model diagnostics); forecasting with ARMA models; seasonal ARMA models; Project Part 4 (ARMA Forecasting) due Sunday 11/19 | 6.7 - 6.8 |
| 11/20 | work on forecasting projects; Thanksgiving holiday | None |
| 11/27 | Project Part 5 (final project presentations); Project report & files due Friday, $12/1$ | |
| 12/4 | Exam 2 opens Wednesday, $12/6$, at 12 p.m. and closes | |
| | Friday, 12/8, at 11:59 p.m. | page 12 of 12 |