



BUSINESS MANAGEMENT 2320
DECISION SCIENCES: STATISTICAL TECHNIQUES
Summer 2018

University Rule: Any student who fails to attend class by the third instructional day of the term, the first Friday of the term, or the second scheduled class meeting of the course, whichever occurs first, without giving prior notification to the instructor will be dis-enrolled. No exceptions!

INSTRUCTOR	Mrs. Bonnie Schroeder
OFFICE	Fisher Hall 330
OFFICE HOURS	W 2:00 PM – 4:00 PM, and other days/times by appointment.
VOICE MAIL	for emergency messages only: (614) 688 - 8062
E-MAIL	<p>schroeder.1@osu.edu</p> <p>All communications must use secure OSU e-mail. Do not use gmail, yahoo, or other personal e-mail accounts. SUBJECT must include BM2320</p> <p>If protocol is followed, you should expect a response by the next business day.</p>
ASSISTANTS	Ryan McGrath, Grant Roberts
OFFICE	Fisher Hall 009
OFFICE HOURS	Tuesday 2:00 PM – 4:00 PM Ryan, Thursday 2:45 PM – 4:45 PM Grant
TEXT	<p><i>Business Statistics</i> (3e) by Sharpe, DeVaux, Velleman; Pearson</p> <p>*The e-edition of the text will be included with access to required MyStatLab</p>
	REQUIREMENT: MyStatLab Access = ISBN 9780321921468
Register in MyLab and Mastering from our Carmen (Canvas) course	<p>MyStatLab is integrated with our Carmen, which requires that you begin the enrollment process in Carmen. Do <u>not</u> register directly through the Pearson web site.</p> <p>Please go to http://www.pearsonmylabandmastering.com/northamerica/students/get-registered-lms/index.html to find printed instructions or to view a video detailing how you register for our Pearson course in Canvas LMS.</p> <ul style="list-style-type: none"> • Use your name as shown in our Carmen course and your OSU e-mail address. • Use your 9-digit BuckID for the special code.
MISCELLANEOUS MATERIALS	<p>Calculator – required for every lecture, recitation, and exam. There are no requirements/restrictions with regard to model of calculator, other than <u>no device of any kind that can communicate with the internet/cloud will be allowed for quizzes and exams.</u></p> <p>Probability tables (Carmen)</p> <p>Course formula packet (Carmen)</p> <p>Personal device to connect to Carmen and MyStatLab.</p>

COURSE OVERVIEW and OBJECTIVES

Vast amounts of data are collected in today's global business and economic environment. The most successful decision-makers and managers are those individuals/groups that 1) can put this information to work effectively to guide their decision process (See examples, page 7); 2) are able to accurately communicate the statistical results that drive these decisions; 3) can work effectively as a member of a diverse team; 4) present themselves in a manner appropriate for a business environment.

Objective 1: Familiarize you with common Classical statistical methods used for generating decision-making information from data, focusing on estimation and hypothesis testing, Analysis of Variance, Regression analysis and model building, forecasting with time series. We emphasize data investigation and mastering statistical reasoning, not mathematical rigor. It will be necessary, then, to learn how to employ statistical computing software to assist with the calculations.

Objective 2: Present sound templates for reporting analytical methodology used for an analysis and the conclusions reached there from.

To achieve objectives one and two, our approach will generally follow a three-step process:

PLAN

- Identify the question that needs to be answered.
- Obtain relevant data. Understand the characteristics of the data.
- Select a model and method. The Normal and Binomial models will be stressed because of their general applicability and ease of implementation, but they are applicable only under certain conditions. Before any calculations are performed, we must verify that the data conditions support the model

CALCULATE (DO)

- All formulas and calculations must be understood, and therefore demonstrated and practiced, in order to use the methods properly. The computational burden will be eased in practice by the use of readily available statistical computer software.

COMMUNICATE (REPORT)

- Proper selection of the model, accurate measurement, and a correct analysis are necessary but not sufficient for the solution of management problems. The final, and most important, part is the interpretation of the results of the analysis. We will emphasize contextual communication of the results of a statistical analysis to a business audience, presented in report format.

Objective 3: Promote development of skills necessary for effective team work. To achieve objective three, will utilize group problem solving in several of our class sessions, mainly via the *Learning Catalytics* platform. Additionally, you will have two assigned "case" projects for which you will be required to work with a team of your classmates.

Objective 4: Encourage development of conduct consistent with expectations in the business environment. To achieve objective four, we will strongly discourage use of electronic devices for anything but class related activities; disrespectful behavior toward other meeting attendees, including the instructor and TA; arriving late to the meeting and/or leaving early. Point deductions can and will be levied for repeat offenders.

LEARNING OUTCOMES

At the conclusion of Business Management 2320, students will be able to

1. Plan strategies for problem solving using the statistical models, methods, and technology introduced in the course discussions and materials.
2. Apply the most appropriate statistical models, methods, and technology to make accurate calculations.
3. Interpret the results of statistical analyses to drive decision-making.
4. Communicate the findings of statistical analyses to a business audience.
5. Collaborate effectively with team mates to plan, execute, and report findings from statistical analyses.
6. Recognize unethical use of statistical analyses and/or the results therefrom.

PROCEDURE

1. HYBRID DESIGN for weekly schedule:

Lecture Prep – Asynchronous on-line learning (Sunday, Monday)

- Watch assigned videos posted on Carmen in weekly instruction module and/or complete assigned readings in Sharpe, et al Business Statistics (3rd Ed) accessed on MyStatLab (average time requirement ≈ 30 minutes). See the “START HERE: Week # Overview” content page in each weekly module for details.
- Complete MyStatLab Lecture Preparation Exercise based on required videos/readings
 - This is a no collaboration activity (N †) .
 - Each exercise will open on Sunday at 12:00 AM and close on Tuesday at 8:30 AM or Thursday at 8:30 AM, as dictated in the syllabus schedule.
 - You will have 2 attempts, each with a time limit of 30 minutes.
 - In order to “Review” the exercise after it closes, you must access and submit the exercise while it is open. I cannot open it for you after it closes. To review your MyLab work go to your MyLab gradebook.
 - Only 10 of the 12 opportunities will count toward your course grade.
- This component prepares you for the lecture discussion to follow on Tuesday (or Thursday). To be successful in the class, you must invest in preparation for lecture.

Lecture – Synchronous 95-minute classroom meeting (Tuesday)

- **Notes will be posted each week on Carmen > Modules > Week # > Lecture Agenda and Materials**
 - Reinforce and expand on videos/readings that were required for lecture prep
 - Demonstrate/apply new content
 - Real-world applications
- Attendance is required* and necessary for successful completion of this course. Lecture attendance correlates positively with exam performance.
- You are responsible for any announcements made during lecture and any impact that they may have on your grade.
- A student response system such as *Top Hat* or *Learning Catalytics* may be used throughout lecture to check comprehension. *Learning Catalytics* is available as part of your MyStatLab subscription. *Top Hat* is available to all students enrolled at OSU. You will need to have a mobile device with you at each lecture class that allows you to connect to *Learning Catalytics*. While cell phones should work, in the past some students have experienced some loss of functionality; laptops, ipads, notebooks, tablets work better than phones.

Recitation – Synchronous 95-minute classroom meeting (Thursday)

- Mixed-use time. Most weeks this time will be used for review/practice, however we will need to introduce new content (“lecture”) during a few weeks. See the schedule on page 9.
- Attendance is required* and necessary for successful completion of this course. Recitation attendance correlates positively with exam performance.
- You are responsible for any announcements made during recitation and any impact that they may have on your grade.
- See the separate Recitation Syllabus

* We have 20 class meetings that are not designated for a quiz or an exam. You can miss 5 (and only 5) classes with no grade penalty to allow you to deal with life’s speed bumps.

Homework – Asynchronous on-line practice (Friday, Saturday)

- Homework will be provided each week in *MyStatLab*.
- Collaboration with peers is encouraged, as teaching and learning from one another will lead to greater understanding of the course material. Copying another student’s work is not allowed and will undoubtedly lead to poor exam performance. (C-A † or ††)
- Each homework assignment is worth 5 points.
- Only 10 of the 12 HW scores will count toward your course grade.
- Each homework will close at 11:59 PM on the Saturday following the lecture to which it pertains.
 - In order to “Review” the homework after it closes, you must access and submit the homework while it is open. We cannot re-open it for you after the assigned due date.
- Additional (ungraded) Practice with solutions will be posted in the Carmen modules with the material for each instructional week.

2. Exams:

- An average of 50% or higher on the quiz and exams is required to pass the class, regardless of performance on the other components. This is a necessary but not sufficient requirement.
- MAKEUP exams
 - In cases of known conflicts, students must take the exam prior to the regularly scheduled time.
 - In cases of unplanned absence due to University approved circumstance (e.g., death of family member, personal hospitalization, etc.), we will provide a make-up exam at a later date, provided proper supporting documentation (e.g., a physician's note, ER paperwork, obituary, etc.) is submitted. Each decision of potentially allowing a make-up exam is made by the Lecture instructor on a case-by-case basis.
 - You MUST contact me prior to the scheduled exam and as soon as you know of a potential problem or conflict with an exam date. Alternative methods (e.g., oral exam, essay) of testing may be used for make-up exams. If you are experiencing an extreme situation or emergency, please notify the instructor via email and/or office voice mail ASAP. (Please see page 1 of the syllabus for e-mail address and phone number.)
- REQUIRED MATERIALS (formula pages, probability tables) will be provided.
- PENCIL must be used to write the exam.
- CALCULATOR is necessary. You are required to supply your own calculator; we do not have replacements available during the exam. There are no restrictions/requirements regarding calculator model other than ...
- NO INTERNET, Wi-Fi, OR CLOUD access is allowed. You will be required to remove and stow your Apple watch, Fitbit, etc.

3. Group Cases: Learning theory and techniques is necessary but not sufficient for statistical analysis in today's business world. Statistical analysis in support of business decisions requires the manager to understand statistical software and interpret statistical results. Whether you are charged with performing the statistical analysis or not, you must be able to determine whether presented statistical results make sense and are reasonable.

- Require the use of statistical computing software:
 - Excel, Excel's Data Analysis Add-in, StatCrunch which is included in MyStatLab
 - Manual calculations will not be accepted unless the item instructions indicate otherwise.
- Detailed information for each case assignment will be **Carmen > SU18 BUSMGT 2320 > Modules > Cases.**
- Teamwork: You will work with a group of your peers to complete each case. Collaboration among all team members is required on all parts of the assignment. You may *not* "divide and conquer" the assignment.
 - The members of each team will be determined by the instructor.
 - We cannot control when a student will drop the class or simply refuse to participate, so be prepared to solve the entire case, no matter what.
 - Each case will allow you to practice and improve not only your statistical skills, but also your written communication skills. Your assignment submission should be worthy of presentation in a professional setting.
 - Each student's contribution to their group's case solution will be peer evaluated by the other team members. Negative peer evaluations for a team member will result in a lowered case grade for that student. The assigned grade for a non-participative student can be 0.
 - Be advised that students given low peer evaluation scores will be teamed together for the next case or may even be required to complete the next case alone.

4. Class Protocol:

- A positive, inclusive classroom environment is necessary for successful learning. To that end, I require that cell phones be turned off except when used to respond to *Learning Catalytics* questions. I require that you be on time for class, try not to enter or leave the room while class is in session, and do not talk with other students except when engaging in solicited classroom discussion or assigned group activities. Further, I **demand** that everyone extends respect and courtesy to one another at all times.
- Use of ipads, notebooks, laptops, and tablets for the purposes of note taking and responding to *Learning Catalytics* questions is permitted. Using these devices for activities unrelated to class is *not* permitted. A student's privilege of using a computer in class can be revoked if such use becomes a distraction or impedes other students' ability to learn.

COURSE GRADE DETERMINATION

Grade Item Type	Description
N †	Independent work: Strictly non-collaborative, original, independent work. Discussion with instructors/TAs only. NO USE of GroupMe, LinkedIn, Google, etc.
C-A † OR †††	Collaboration allowed: Discussion with other students enrolled in the course is allowed.
C-R †††	Collaboration required: An explicit expectation for collaborative team effort
N/C † / †††	Individual Round = Independent work: Strictly non-collaborative, original, independent work. Discussion with instructors/TAs only. NO USE of GroupMe, LinkedIn, Google, etc. Group Round = Collaboration required: An explicit expectation for collaborative team effort

EVALUATION			
Category	Item Points	Category Points	Percentage
Lecture Prep (N †)	5	50	5
Stat1430 Retention Quiz (N †)	100	100	10
1 Midterm Exam** (N †)	250	250	25
Final Exam** (N †)	250	250	25
2 Cases (C-R)	100	200	20
Attendance/Participation (N/C)	7	100	10
Homework (C-A)	5	50	5
Total		1000	100

An average of 50% or higher, without rounding, on the combined quiz, midterm, and final exam is required to pass the class, regardless of performance on the other components. **This is a necessary, but not sufficient, requirement.

Grading Scale: The class earned distribution will adhere as closely as possible to the Ohio State University recommended distribution. The anticipated distribution is:

A = 93% and above	B+ = 87% to 89.9%	C+ = 77% to 79.9%	D+ = 65% to 69.9%
A- = 90% to 92.9%	B = 83% to 86.9%	C = 73% to 77.9%	D = 60% to 64.9%
	B- = 80% to 82.9%	C- = 70% to 72.9%	E = below 60%

GRADE APPEAL POLICY

Although we make every effort to grade in a consistent and fair manner, occasionally an error is made or a student feels that an error has been made. Any notification of a missing grade or request for re-evaluation of a grade must be **submitted, in writing, within two weeks** of grade availability. Any re-grading of work will result in the entire document being re-evaluated. You must check your scores in MyStatLab and in Carmen regularly. Claiming ignorance of a missing grade will not be accepted as a legitimate reason to revisit a grade after the two week deadline.

COMMUNICATIONS REGARDING GRADES

Due to increased security concerns by the University regarding "sensitive" information, absolutely no student grade information will be shared via e-mail.

DISABILITY ACCOMMODATION

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated. Students with such accommodation must inform the instructor as soon as possible of their needs. In the case of special exam accommodation, you, the student, are responsible for ensuring that your proctor form has been properly filled out, signed, and returned to the Office for Disability Services according to their scheduling requirements. If you fail to do so, and ODS will not provide proctoring for you, you will take the exam as scheduled for the class with no special provision. The Office for Disability Services is located in 098 Baker Hall, 113 West 12th Avenue; telephone 292-3307, TDD 292-0901; General business email: slds@osu.edu ; Exam accommodations email: slds-exam@osu.edu

GRADUATING SENIORS

Graduating seniors must make their status known to their instructor at the beginning of the semester and follow up with a reminder during the last week of classes.

TITLE IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu"

ACADEMIC INTEGRITY (ACADEMIC MISCONDUCT)

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and in this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If we suspect that a student has committed academic misconduct in this course, we are obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact one of the instructors.

Other sources of information on academic misconduct (integrity) to which you can refer include:

The Committee on Academic Misconduct web pages (<https://oaa.osu.edu/academic-integrity-and-misconduct>)

Ten Suggestions for Preserving Academic Integrity (<https://oaa.osu.edu/academic-integrity-and-misconduct/student-misconduct>)

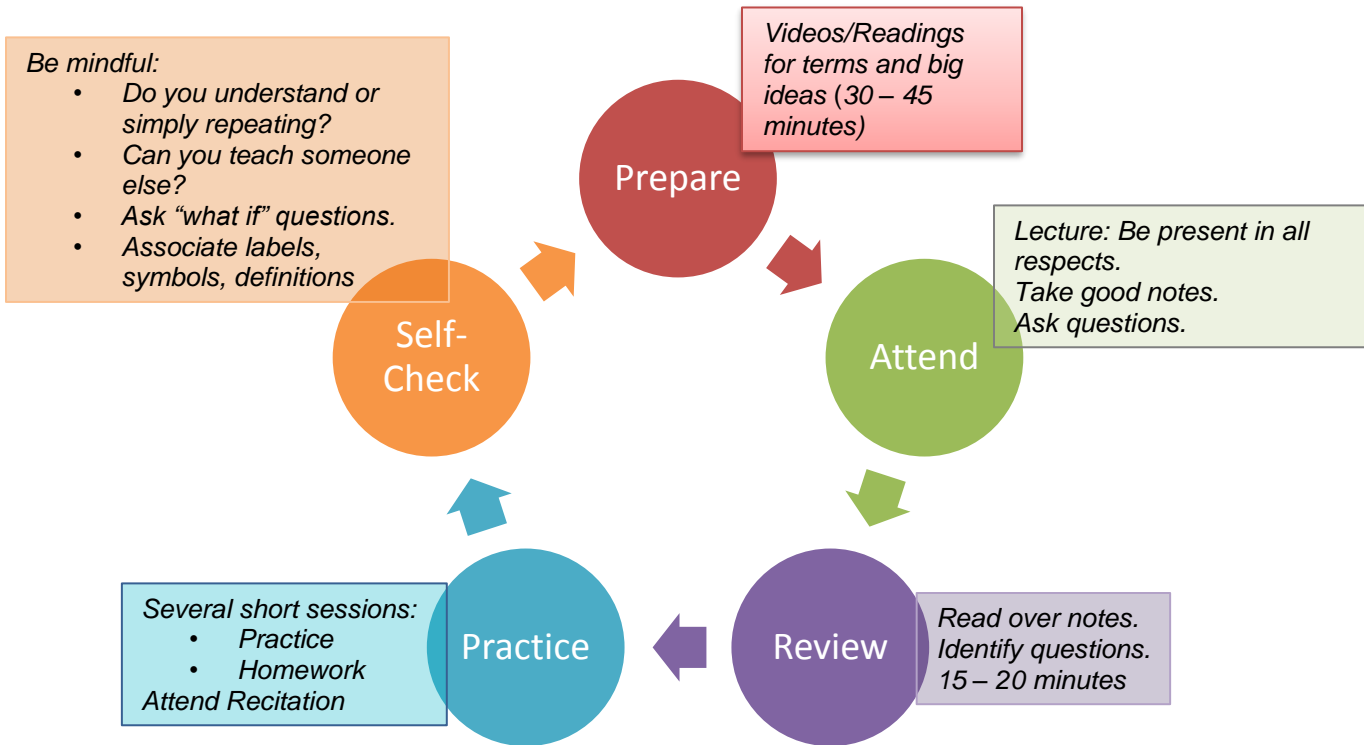
Technology Help	
OSU	<p>For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at https://ocio.osu.edu/help/hours, and support for urgent issues is available 24x7.</p> <ul style="list-style-type: none"> • Self-Service and Chat support: http://ocio.osu.edu/selfservice • Phone: 614-688-HELP (4357) • Email: 8help@osu.edu • TDD: 614-688-8743
FISHER COB	<p>Lab facilities are available on the lowest level of Mason Hall for use by students accepted to the FCOB. These facilities are not open to non-FCOB students, and no exceptions are ever made.</p> <p>For questions related to the use of these labs that the lab monitors can't answer, get help at helpdesk@fisher.osu.edu</p>
PEARSON	<p>See document titled "Trouble-shooting in MyStatLab" posted on Carmen > Modules > Resources.</p>

TIPS FOR SUCCESS IN THIS COURSE

1. Attend all lectures and recitations with a positive attitude.
2. Stay current with the course material. Each week's material uses the prior weeks' material as foundation. It is difficult and risky to build on a weak foundation.
3. Practice as many problems as time will allow. You cannot learn to swim without getting into the water; you cannot learn to prepare gourmet meals by watching "Iron Chef;" you cannot learn statistics without putting pencil to paper (or fingers to keyboard) – a lot!
4. Ask questions. Seek help, in class and out. Take advantage of the 50+ weekly office hours.
5. Take effective notes. Often times your instructor's comments are more important than what is already printed or gets written.
6. Communicate any problems you are having or emergencies that arise to your instructor or TA immediately. We can be of most help when asked or notified with ample lead-time.
7. Participate in any open discussions.
8. Form study groups. Studying with other students is definitely encouraged. Articulating the material in your own words is helpful in reviewing the lecture material, as is testing each other on content.

To succeed, keep pace with the schedule:

		Lecture		Recitation		
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Attend Lecture	Review/ Practice to prepare for recitation	Attend recitation		
					Homework to solidify knowledge	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday



TESTIMONIALS

“I was asked to explain how I would attack a particular business problem in my interview with *L Brands*, and I was able to use what I learned from one of our case studies to respond. They were really impressed! I was offered an internship.”

... and I was a student in your business statistics class during Autumn of 2015 at OSU. I’m currently interning at Cardinal Health as a marketing analyst, and I thought I would say thank you for all that you taught me during that class. Many of my projects require a deep understanding of the statistical models we learned about, and I’ve been simplifying most of the work using my experience in Minitab. Thank you for the thorough instruction and keep up the excellent work!

.... although the material had not been my favorite at the time, I learned much throughout your class. Currently, I am interning at GE Lighting in Cleveland, and **have used what you taught in class more than I thought! We are currently learning about Six Sigma with Green Belts and Black Belts, and, I understand much more than my fellow interns.** Specifically, the case studies you had used in class have helped a great deal. I just wanted to shoot you an email thanking you for the class. Even though the material was hard at first, **understanding even the basics have benefitted greatly in the workplace.**

I just want to thank you for helping me during office hours... Honestly, it was intimidating to come to the first office hour, but after getting to know each other better and you helping me answer my questions and understand concepts, I felt like I was a fool for not coming earlier before midterm 1!!! With all the professors I’ve had up until my 2nd year, I think you’ve been the most helpful and influential. Thanks you so much, again for a great semester!

I just wanted to send you a quick e-mail. I know I told you this in your office before the final but I wanted to let you know again how much I **appreciated your class.** I received a B this semester in your class and it was the hardest B I’ve ever worked for. **From your class I learned how to study and balance things on a whole new level**

Tentative Course Schedule – Summer 2018

Week	Dates	Agenda	Text Reference	
1	R 5/10	Course Introduction Normal Distribution Review	Chapter 7	
2	T 5/15	Sampling Distributions CI Estimation [p and μ]	Chapter 9 Chapter 11	Lecture Prep #1
	R 5/17	Stat 1430 Retention Quiz		
3	T 5/22	Hypothesis Tests Part I [p and μ]	Chapter 10 Chapter 11.7 Chapter 12.1 – 12.4	Lecture Prep #2
	R 5/24	HT Part II [μ] – Student's t Review/Practice	Chapter 11.4 – 11.7	
4	T 5/29	HT Part III [p and μ] Type I and II errors, Power	Chapter 12.5 – 12.6	Lecture Prep #3
	R 5/31	Practice/Review		
5	T 6/5	Comparing 2 populations: μ_d , $\mu_1 - \mu_2$, $p_1 - p_2$	Chapter 13 Chapter 14.5	Lecture Prep #4
	R 6/7	Review/Practice		
6	T 6/12	Chi-square Tests	Chapter 2.3 Chapter 14	Lecture Prep #5
	R 6/14	Practice/Review		Case #1 due
7	T 6/19	MIDTERM		
	R 6/21	ANOVA Part I	Chapter 20.1 – 20.7	Lecture Prep #6
8	T 6/26	ANOVA Part II	Chapter 20.8 – 20.10	Lecture Prep #7
	R 6/28	Simple Linear Regression Part I	Chapter 4.1 – 4.7	Lecture Prep #8
9	T 7/3	Simple Linear Regression Part II	Chapter 4.8 – 4.11 Chapter 16.1 – 16.3 Chapter 15.1 – 15.4	Lecture Prep #9
	R 7/5	No class		
10	T 7/10	Multiple Regression Part I	Chapter 17.1 – 17.5	Lecture Prep #10
	R 7/12	Multicollinearity Practice/Review	Chapter 16.6 – 16.7 Chapter 18.1, 18.2, 18.5, 18.6	
11	T 7/17	Multiple Regression Part II		Lecture Prep #11
	R 7/19	Practice/Review		
12	T 7/24	Forecasting with Time Series	Chapter 19.1 – 19.4	Lecture Prep #12
	R 7/26	Forecasting with Time Series	Chapter 19.5 – 19.8	Case #2 due
	M 7/30	Final Exam, 10:00 – 11:45		

Weekly MyStatLab Homework due Saturday at 11:59 PM