

1
BUSINESS MANAGEMENT 2320
DECISION SCIENCES: STATISTICAL TECHNIQUES
Summer 2017

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	T, R: 11:00 AM – 1:00 PM and other times by appointment.
VOICE MAIL	for emergency messages only: 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 no later than the next business day.</p>
ASSISTANT	Christine Dawson
E-Mail	
OFFICE	Fisher Hall 009
OFFICE HOURS	W, 3:30 PM – 5:30 PM
TEXT*	<p><i>Business Statistics</i> (3e) by Sharpe, DeVeaux, Velleman; Pearson</p> <p>*The e-edition of the text will be included with access to required MyStatLab</p>
MyStatLab	If you do not already have this from a prior semester, DO NOT PURCHASE YET!
	It must be registered through Carmen. DO NOT REGISTER AT THE PEARSON HOME PAGE.
	Details to follow.
MISCELLANEOUS MATERIALS	<p>Calculator – required for every lecture, recitation, and exam. There are no requirements/restrictions with regard to model, but <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.

WEEKLY SCHEDULE

Complete Preclass Readings –assigned pages in Sharpe, et al *Business Statistics (3rd Edition)* available in Pearson MyStatLab

- Prepare for class exercise/evaluation
- Prepare for class discussion/presentation.

Attend Class – notes available on Carmen

- Follow a lecture – lecture schedule, rather than lecture – recitation schedule
- Development/presentation/application of new content
- Periodic review/practice days
- Graded assessment of understanding will take place during every meeting.
- MyStatLab; you must have a personal device (laptop, tablet, phone, etc.) from which you can access Carmen and MyStatLab. FYI, phones tend to be unreliable. **Anyone caught submitting responses for another student or sending the session code to a student who is not in class will forfeit all participation points for the semester.**

Complete Additional Readings and/or Watch Videos

- Reinforce and expand on class discussion
- Videos are available to review most course topics and will be accessed in Carmen.

Practice – Reading and re-reading the notes and text will not be sufficient for you to understand the concepts and, by extension, for you to successfully complete cases and exams. The following practice opportunities will be provided and should be attempted after the associated material has been covered in video and/or class.

- **Required Homework using Pearson MyStatLab** will be due each Sunday by 11:59 PM, starting on 5/21, except Sunday, 6/4, and Sunday 7/2.
- Optional additional practice will be posted on Carmen with most weekly modules.
- MyStatLab – My Study Plan

EVALUATION

Components:

	Item Points	Percentage
Class Participation/Evaluation	100	10
MyStatLab Homework (10 @ 10 points)	100	10
Technology Assignment	40	4
Group Case 1	55	5.5
Group Case 2	55	5.5
Midterm 1**	200	20
Midterm 2**	200	20
Final Exam**	250	25
Total	1000	100

****An average of 50% or higher on the exams is required to pass the class, regardless of performance on the other components. This is a necessary, but not sufficient criterion; it must be achieved to qualify to pass, but will not guarantee passing by itself.**

Grading Scale: The class earned distribution will adhere as closely as possible to the Ohio State University recommended distribution (A = 93% and above, A- = 90% to 92.9%, B+ = 87 to 89.9%, etc.).

WARNING: You are responsible for any and all announcements made during class regarding additional assignments, modifications to instructions, and graded items in general. Being uninformed due to absence from class may have a negative impact on your grade.

EXAMINATION POLICY

The exam dates are identified in the course schedule on page 6 of this syllabus. Enter these dates into your personal calendar NOW. Missed exams can only be made-up in extreme cases (e.g., death of family member, personal hospitalization, etc.) with proper documentation (e.g., a physician's excuse from work/school, ER paperwork, obituary, etc.). Each decision to allow or not allow a make-up exam is made by the instructor on a case-by-case basis. Additionally, you MUST contact the instructor (schroeder.1@osu.edu) as soon as you know of a potential problem or conflict with an exam date. Alternative methods (e.g., oral exam) of testing may be used for make-up exams. Further, make-up exams are often more challenging than the original exam.

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 request for re-evaluation of a grade must be **submitted, in writing, within two weeks** of grade availability. This includes potential keystroke errors and missing grades in the Carmen grade book. Check your grades in Carmen every week. A dash = 0.

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.

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 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 (oaa.osu.edu/coam/home.html)
- *Ten Suggestions for Preserving Academic Integrity* (oaa.osu.edu/coam/ten-suggestions.html)

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"

DISABILITY ACCOMMODATION

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

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,</p>

TIPS FOR SUCCESS

1. Attend all classes with a positive attitude.
2. Participate in any open discussions.
5. Take effective notes. Often times your instructor's comments are more important than what is already printed in the lecture slides or gets written during class.
6. Keep up. Each week's material uses the prior weeks' material as foundation. It is difficult and risky to build on a weak foundation.
7. Study in groups. Studying with other students is definitely encouraged. We cannot stress strongly enough the high value of explaining, or attempting to explain, the course material to someone else.
8. 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 seeing and working many different problems!
9. Ask questions. Seek help, in class and out.
10. 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.

Tentative Course Schedule – Summer 2017

Week	Dates	Agenda	Text Reference	
1	R 5/11	Course Introduction Normal Distribution Review	Chapter 7	
2	T 5/16	Sampling Distributions	Chapter 9.1 Chapter 11.1 – 11.3	
	R 5/18	CI Estimation [p and μ]	Chapter 9.2 – 9.4 Chapter 11.4 – 11.6	
3	T 5/23	Hypothesis Tests Part I [p and μ]	Chapter 10 Chapter 11.7 Chapter 12.1 – 12.4	Technology Assignment due
	R 5/25	HT Part II [μ and p] – Type I and II errors, Power	Chapter 12.5 – 12.6	
4	T 5/30	Review/Practice		
	R 6/1	Midterm 1		
5	T 6/6	Comparing 2 populations: $\mu_1 - \mu_2$, $p_1 - p_2$	Chapter 13 Chapter 14.5	
	R 6/8	Chi-square Tests	Chapter 2.3 Chapter 14	
6	T 6/13	One-way ANOVA Part I	Chapter 20.1 – 20.7	
	R 6/15	One-way ANOVA Part II	Chapter 20.8 – 20.9	
7	T 6/20	Two-way ANOVA	Chapter 20.10	
	R 6/22	Review/Practice		Case #1 due
8	T 6/27	Midterm 2		
	R 6/29	No class meeting: Simple Linear Regression Part I - on-line videos	Chapter 4.1 – 4.7	On-line Exercise
9	T 7/4	University Holiday – no classes		
	R 7/6	Simple Linear Regression Part II	Chapter 4.8 – 4.11 Chapter 16.1 – 16.3 Chapter 15.1 – 15.2	
10	T 7/11	Simple Linear Regression Part III Review/Practice	Chapter 15.3 – 15.4 Chapters 4, 15, 16	
	R 7/13	Multiple Regression Part I	Chapter 17.1 – 17.5	
11	T 7/18	Multiple Regression Part II and Special Topics	Chapter 16.6 – 16.7 Chapter 18.1, 18.2, 18.5, 18.6	
	R 7/20	Review/Practice		
12	T 7/25	Forecasting with Time Series	Chapter 19.1 – 19.4	
	R 7/27	Forecasting with Time Series	Chapter 19.5 – 19.8	Case #2 due
	M 7/31	Final Exam, 10:00 – 11:45		

Weekly MyStatLab Homework due Sunday at 11:59 PM

SAMPLING OF APPLICATIONS

Accounting

- Estimate mean amount receivable among all customers
- Estimate costs by determining the relationship between a cost and some measure of the level of activity creating that cost, e.g., selling expenses and total sales, direct labor costs and batch size, electricity costs and hours of machine time

Finance and Economics

- Estimate average returns on investment
- Measure risk associated with investment instruments or portfolios
- Estimate relationship between price and demand
- Estimate relationship between performance of individual stock and the performance of a stock index

Human Resources

- Predict employee retention
- Assess relationship between employee screening tests and job success
- Estimate relationship between salary and employee characteristics to guard against discrimination or to explain severance packages

Marketing

- Understand market segmentation - estimate characteristics of likely consumers of a product
- Estimate exposure to advertising
- Estimate market share

Operations Management

- Estimate expected completion time of a project
- Estimate demand for a product during lead time
- Estimate relationships between revenues or costs and proximity to suppliers, skilled labor, etc.
- Determine service level

.... And so many more!

From past students:

“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 heard a lot of stories about how tough your class was going into this past quarter. But I actually really enjoyed your class and learned a lot of applicable skills that I will use in the future. So I'd like to thank you for a great quarter and hope spring goes just as good for you!

I took your class last fall. This fall I am taking a course in Six Sigma. Our current topic for our midterm next week is all about hypothesis testing and statistical analysis. So I just wanted to thank you for drilling it into our heads so well all those statistical concepts that I can now easily breeze through.

.... 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 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***

*I wanted to reiterate today what I said in class and that is thank you. I believe your teaching structure to be very beneficial to students and time effective. **you truly care about the students and have always been willing to help no matter how simple the question.** Though this will most likely be my first C in my academic career I have learned a lot from the class and the experience overall. I hope the rest of the week goes well for you and you have an enjoyable break! All the best and Go Bucks,*

I just want to thank you, from the bottom of my heart, for this past quarter! This class has been so hard for me and I know that I barely passed, I just want to thank you so much for dealing with me and not giving up on me! I'll always be grateful!

.... thank you for a wonderful semester in your class. I thoroughly enjoyed having you as a teacher. It is very evident that you care a great deal about the success of your students, which is so encouraging. I hope you have a wonderful summer.

I can not begin to thank you for everything that you have done for me this semester. You have taught me so much about stats and ultimately how to be prepared in and out of the classroom. Thanks you for spending extra time with me on Tuesdays to further my knowledge about the recitation and the class. This time, on top of the countless hours I put in studying allowed me to be successful on the final exam. I am thankful to have had a professor that cared as much as you.

.... and on and on