



## **Dillard College of Business Administration**

### **Syllabus: Advanced Applied Business Statistics**

BUAD 5603, Section 170

Class: 5:30 pm – 6:50 pm, Tuesday, DCOBA 175

Fall 2021

#### **CONTACT INFORMATION:**

Instructor: Dr. John E. Martinez  
Office Building: Dillard College, Second Floor, Room 255  
Office Phone: (940) 397-4722  
E-mail: [john.martinez@msutexas.edu](mailto:john.martinez@msutexas.edu)  
Office Hours: 9:30 am to 11:00 am Monday and Wednesday  
2:30 am to 4:30 am Wednesday  
or by appointment.

ZOOM Link to Invite Student Attendees:

[Join Zoom URL: https://msutexas-edu.zoom.us/j/93979429839](https://msutexas-edu.zoom.us/j/93979429839)

Every Wednesday at 6:00pm starting January 13.

#### **SYLLABUS CHANGE POLICY:**

This syllabus is a guide for the course and is subject to change. All changes will be announced in class and students will be responsible for incorporating the changes into the syllabus. If, at some point, the university switches to an online format, then there will be significant changes in the manner in which exams are administered. Any exam taken online will be monitored through RESPONDUS, which will require students to have access to a webcam video.

#### **COURSE MATERIALS:**

##### **REQUIRED:**

Anderson, Sweeney, and Williams: Essentials of Statistics for Business and Economics, 5e 2009, Thomson South-Western

ISBN 13: 978-0-324-65421-9 ISBN 10: 0-324-65422-7

This text is designed to help students fully understand descriptive and inferential statistical analysis, its components, and its uses. Taking into consideration current statistical technology, it focuses on the use and interpretation of software, while also demonstrating the logic, reasoning, and calculations that lie behind any statistical analysis. Furthermore, the text emphasizes the application of statistical tools to real-life business concerns.

## **ANCILLARY MATERIAL:**

**In addition to the required texts, students need to have access to the following:**

- WebCam video
- Thumb drive:

Each student should have a thumb drive (USB) on which to keep various data sets and assignments that will be a part of each class. Projects and assignments may include the requirement that electronic versions of your work be submitted.

**SAS software is installed in most DCOBA labs.**

## **Course Description**

Taking into consideration current statistical technology, the course focuses on the use and interpretation of software, while also demonstrating the logic, reasoning, and calculations that lie behind any statistical analysis. Furthermore, the course emphasizes the application of statistical tools to real-life business concerns.

**The course is structured around the most commonly used SAS statistical procedures.** You will also learn how to test the assumptions for all relevant statistical tests. Major topics featured include descriptive statistics, one-and two-sample tests, ANOVA, correlation, linear and multiple regression, and analysis of categorical data.

## **Course Pre-requisites**

BUAD 3033 or equivalent and consent of Graduate Coordinator.

## **LEARNING GOALS**

### **A. General Learning Goals (GLC):**

- The general objective of this course is to review and solidify the knowledge gained in undergraduate statistics course and enhance the ability to use statistical analysis in decision-making process.
- Problem solving and decision making abilities through critical analysis, evaluation and interpretation of business information. Problem solving skills and interpretation of results will be assessed exams and quizzes.
- Ability to use statistical Software **(with emphasis on SAS)**.
- Ability to comprehend statistical discussions and comment on them.

### **General Learning Goals (GLC) associated with Assessment of Learning (AOL)**

#### **GLG3: Students will produce creative responses to business situations.**

Objective: Our graduates will demonstrate the capability to critically analyze business situations and develop creative solutions to opportunities and problems.

#### **GLG4: Our students will integrate knowledge across business disciplines.**

Objective: Graduates will demonstrate the capability to integrate knowledge across business disciplines.

#### **GLG5: Our students will communicate (in written form) at a professional level.**

## **B. Course Specific Learning Goals:**

- Summarize data using descriptive statistics.
- Understand the appropriate methodology for computing all statistical measures covered in this course.
- Apply basic statistical measure to the solution of structured business problems and interpret results.
- Understand the Ordinary Least Squares model and its applications.
- Apply hypothesis testing to business problems and estimates of coefficients.
- The course includes examples using ODS Statistical Graphics procedures such as SGPLOT, SGSCATTER, and SGPANEL that show how **SAS** can produce the required statistics.

## **C. SAS Skill Set Learning Goals**

- Data Visualization
- SAS Programming
- Statistical Analysis
- Descriptive Analytics

## **Information about SAS Certification**

Taking SAS certification exams help you validate your skills and increase your value to an employer. You can choose SAS certifications across many subjects, including programming, data management, and analytics, to name a few. For more information on SAS certification go here:

[https://www.sas.com/en\\_us/certification.html](https://www.sas.com/en_us/certification.html).

All students, teachers, professors or staff associated with an academic institution qualify for **50% discount** on all SAS certification exams. Please contact [certification@sas.com](mailto:certification@sas.com) to receive the discount code that will reduce the exam fee by 50% during the registration process.

## **Resources for Learning SAS**

SAS Certification Prep Guides:

[https://www.sas.com/store/books/categories/certification-guide/cBooks-cbooks\\_categories-cbooks\\_categories\\_12-p1.html](https://www.sas.com/store/books/categories/certification-guide/cBooks-cbooks_categories-cbooks_categories_12-p1.html)

Visit SAS Communities Visit our online sites to share and connect with other SAS users and build your SAS skills. Don't miss key communities including: SAS Certification, SAS Training, SAS Academy for Data Science, SAS Programming, New SAS User, SAS Analytics U and SAS Viya for Learners.

<https://communities.sas.com/t5/Learn-SAS/ct-p/learn>

## **COURSE POLICIES:**

### **A. Attendance Policy:**

Students are expected to attend all class meetings for this course. Each meeting of the class will run as scheduled. Many important announcements are provided in class. You should always contact your instructor when you are absent.

You are expected to log into D2L a minimum of once weekly to check for updates and announcements via postings and email. See the university catalog for the University Class Attendance Policy.

## **B. Other Related Policies**

### **Electronic Communication Devices**

Use of personal electronic communication devices is discouraged during class sessions and students are encouraged to disable these instruments while attending class.

Individuals holding devices that disrupt class may be asked to leave the class for the remainder of the session. Personal electronic communication devices are not permitted during examinations. If you plan to use a calculator during exams, you must have one that is independent of communication devices.

### **Expectation**

Answers you provide in exams and case studies are expected to reflect logical reasoning, to be well articulated, including correct grammar and punctuation and to be clearly legible, in a manner and format that would be acceptable for a business report in a commercial setting. Students will be expected to develop a base knowledge in using SAS. Each student is expected to become sufficiently familiar with the Desire-2-Learn (D2L), as it will be a primary communication instrument for this class.

## GRADING and EVALUATIONS:

A student's grade will be based on a weighted average of the following:

MAJOR EXAMS	40%
Exam I	20%
Exam II	20%
FINAL EXAM	40%
Managerial Cases	20%
Case Set I – Written Presentation	10%
Case Set II – Written Presentation	10%

## GRADE EVALUATION:

As a **percent** of total points (1000pts):

A (Above 90%), B (80-89%), C (70-79%), D (60-69%), F (below 60%)

## Total Points:

[Exam Avg. X 3.0] + [Final X 4.0] + [Case Avg. X 3.0]

## Syllabus Statement – Addendum

In order to help students keep track of their progress toward course objectives, the instructor for this class will provide a Midterm Progress Report through each student's Web World account. Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students earning below a C at the midway point should [schedule a meeting with the professor? Seek out tutoring? Both?]

## Major exams:

Three major exams will be given. Each exam will involve calculation and derivation of answers as well as their interpretation and meaning. Questions will come from the text and notes. **A significant portion of each exam involves interpreting output derived from SAS and EXCEL.** Failure to take an exam on the scheduled date without prior permission from the instructor will result in a zero for that exam. Failure to take any exam without prior approval will result either in an 'F' or 'I' (incomplete) for the course. If, because of a truly unavoidable situation, you are absolutely not able to take an exam at the scheduled time/date, it is your responsibility to contact your instructor well in advance to ask to take the exam early. If a real, legitimate, last minute emergency occurs, it is your responsibility to contact me before the exam begins.

## Final exam:

A comprehensive final exam will be given with greater emphasis on later material. This exam will be a multiple-choice exam monitored through RESPONDUS.

**Managerial Cases – Written Assignments:**

Two sets of Managerial Cases are required. The goal of each case is to correctly understand a business situation, solve a real problem, and make a good business decision. Designated cases with specific formatting guidelines are attached at the end of this syllabus. **Statistical output for these cases will be generated using SAS.**

**Class Participation:**

Students are expected to participate in all class discussions. Participation includes more than attendance. It also requires punctuality and attentiveness, as well as asking and answering questions.

**Lower Grades:**

The instructor reserves the right to lower any student's final grade by a letter grade (i.e., A to B, D to F) for:

- (A) A negative, rude, unreasonably argumentative or inattentive attitude in class, or,
- (B) Repeatedly disrupting the class for any reason (tardiness), or,
- (C) Three or more absences, or
- (D) **NOT** showing respect for fellow classmates' questions, opinions, or class presentations.

**Campus Carry:**

Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information regarding campus carry, please refer to the University's webpage at [Campus Carry Polices Link](#).

**Academic Integrity:**

With regard to academic honesty, students are referred to the "Student Honor Creed" of Midwestern State University Undergraduate Catalog, which may be found using the following MSU link: [Link to Student Honor Creed](#).

**Americans with Disabilities Act:**

This class follows the guidelines suggested by the Center for Counseling and Disabilities Services for those students who qualify for disability services. See Midwestern State University Undergraduate Catalog which may be found at: [Link to Suggested Guidelines Center for Counseling and Disabilities Services](#).

**D2L:**

The Midwestern State University D2L program will be incorporated into this class and will provide the primary default means of communication. Each student is expected to master the use of D2L. Assistance to achieve comfort using this program will be available as needed. Grades will be posted using D2L.

## **OTHER RELEVANT INFORMATION:**

### **Midwestern State University Student Handbook:**

See the most recent MSU Student Handbook for a statement of the university's policy on academic dishonesty. Any other questions not specifically addressed by this syllabus are governed by the student handbook.

### **Medical or Other Serious Problems:**

Please take time and make the effort to advise me if you have difficulties that require my attention to properly evaluate your classroom participation and activities.

### **Tape Recordings and Cell Phones:**

Tape recording of lectures is permitted. You may not tape record any information or class discussion when a graded test is being reviewed. Cell phones and pagers are prohibited unless the instructor has granted permission to have them in class.

### **Return of Exams:**

Never download or take a photo of any exam or graded answer sheet. This will result in an automatic zero (0) on the exam.

### **Plagiarism Statement:**

“By enrolling in this course, the student expressly grants MSU a “limited right” in all intellectual property created by the student for the purpose of this course. The “limited right” shall include but shall not be limited to the right to reproduce the student’s work product in order to verify originality and authenticity, and educational purposes.”

### **Correspondence**

All correspondence regarding grades or class issues must be conducted through email using your **Midwestern State University (MSU) email or through D2L** . I will not return answers to questions to other email accounts and will not discuss grades or class standing over the phone. Since email or D2L messages are the most convenient means of communication, it is recommended that students use and regularly monitor their MSU email and D2L account. The subject line of any message sent to me in relation to this class MUST be the following: **BUAD 5603 First, Last Name**.

### **Netiquette: Communication Courtesy Code**

Students are expected to follow rules of common courtesy in all email messages, class discussions, lecture hall posts, chats, etc. If I consider any of them to be inappropriate or offensive, I will forward the message to the Chair of the department and the online administrators and appropriate action will be taken.

### **Deadlines**

**Do not wait for the last minute to do any assignment.** Check D2L for all assignments and the deadlines. Reply and check for replies on every email sent and received. The student is responsible for getting the work to me on time.

**Course Schedule – Schedule is subject to change**

<b>Class</b>	<b>Date*</b>	<b>Class Coverage</b>
1	Aug 23	Class Expectations and Requirements Chap01 Data and Statistics - ASW An Introduction to SAS
2	Aug31	Chap02 Descriptive Statistics – Tabular and Graphical
3	Sep07	Chap03 Descriptive Statistics – Numerical Measures-ASW
4	Sep14	Chap04 Into to Probability – ASW Chap05 Discrete Probability Distributions - ASW
5	Sep21	Chap06 Continuous Probability Distributions – ASW
6	Sep28	<b>Exam I</b>
7	Oct05	Chap07 Sampling and Sampling Distributions – ASW Chap08 Interval Estimation - ASW
8	Oct12	Chap09 Hypothesis Tests - ASW
9	Oct19	Chap11 Comparisons Involving Proportions and Tests of Independence – ASW
10	Oct26	<b>Review of Cases</b>
11	Nov2	<b>Exam II and Case Set I due</b>
12	Nov9	Chap10 Analysis of Variance - ASW
13	Nov16	Chap12 Simple Regression - ASW
14	Nov23	Chap13 Multiple Regression - ASW
15	Nov30	<b>Case Set II due</b>
16	Dec07	<b>Final Exam</b> <a href="https://msutexas.edu/registrar/_assets/files/pdfs/fall21finals.pdf">https://msutexas.edu/registrar/_assets/files/pdfs/fall21finals.pdf</a>

\*All Dates are Tentative

- ASW - Essential statistics by Anderson, Sweeney, and Williams

**See MSU Spring 2021 Calendar:**

[https://msutexas.edu/registrar/\\_assets/files/pdfs/acadcal2122.pdf](https://msutexas.edu/registrar/_assets/files/pdfs/acadcal2122.pdf)

**Format for Managerial Case Writing Assignments**

- Each student is responsible for completing two sets of designated Managerial Case Reports (see list below).
- Each case should include the following components:
  1. Statement of the problem
  2. Statistical Results
  3. Policy conclusions

Append the following to each case:

1. **SAS Program**
2. **SAS Output**

- Use Microsoft’s WORD processor, **with SAS inserts**, to complete this assignment.
- At the end of each case is an Assignment that students are to complete.



- Students are required to identify relevant variables, choose the appropriate analysis plan, produce correct results, interpret their findings and make recommendations regarding the managerial issues presented.
- Data sets for the various cases will be provided in the Contents section of D2L. Each case assignment should be based on the information provided in the case itself.
- Consult the two following articles for clarification about writing proper statistics reports:  
**Teaching Students to Write About Statistics** by Mike Forster  
**An Approach to Report Writing in Statistics Courses** by Glenda Francis
- Use one-inch margins throughout and either 10 or 12 character font.
- In addition to the three General Learning Goals (GLC) stated above, this assignment is graded on the basis of accuracy, relevancy, neatness, style, thoroughness, and punctuality, as well as on the professionalism of your WORD and SAS output.
- Significant penalties are assessed for late work.
- A drop box folder will be set up in D2L for you to submit your work.
- Missing even one case will entail severe penalties.
- Provide the following information at the beginning of each case:  
**First and Last Name**  
**Case title (i.e., Glenco, etc.) - Set I (or II)**  
**Semester, Year**
- The following cases, which can be found in your text (Business Cases in Statistical Decision Making), are required:

### **Managerial Case Set I**

Required cases: **Circuit, Glenco Bonus, & ServePro**

The first case set is due by \_\_\_\_\_ pm on \_\_\_\_\_, \_\_\_\_\_.

### **Managerial Case Set II**

Required cases: **Easton, Pronto, & Ryder**

The second case set is due by \_\_\_\_\_ pm on \_\_\_\_\_, \_\_\_\_\_.

## ADDENDUM

### Sample SAS program from individual chapters

**Title 'SAS Programs for Chap03' ;**

```
proc import datafile="E:\StartSalary.xlsx" out=StartSalary1
    DBMS=EXCEL REPLACE;
    GETNAMES=YES;
    /*RANGE="Sheet1$"; */
    RANGE="Data$";
run;
proc contents position data=StartSalary1;run;
proc print data=StartSalary1 (obs=3);run;
ods listing;ods graphics off;
proc univariate data=StartSalary1 normal plot;
var Starting_Salary;run;quit;
```

```
ods listing;ods graphics off;
proc univariate data=StartSalary1 plot;var Starting_Salary ;
histogram / normal( mu=est sigma=est);run;
```

```
proc import datafile="E:\Price-share.xlsx" out=PriceShare1
    DBMS=EXCEL REPLACE;
    GETNAMES=YES;
    /*RANGE="Sheet1$"; */
    RANGE="Data$";
run;
proc contents position data=PriceShare1;run;
proc print data=PriceShare1 (obs=5);run;
ods listing;ods graphics off;
proc univariate data=PriceShare1 normal plot; var P_S ; run;
ods listing;ods graphics off;
proc univariate data=PriceShare1 normal plot;var P_S ;
histogram P_S / normal midpoints = 35 45 55 65 75 85 95 105 115 125 135 145
155 165;run;
ods listing;ods graphics off;
proc univariate data=PriceShare1 plot;
histogram P_S/ normal( mu=est mu=est);run;
ods listing;ods graphics off;
proc univariate data=PriceShare1 plot;
histogram P_S / midpercents endpoints = 30 to 170 by 10;run;
```

## ADDENDUM

### Example of SAS Code for Managerial Cases

```
/*Code for Easton Import*/
title 'Importing easton data from excel data file';
options ls=72;
PROC IMPORT OUT=easton
DATAFILE="E:\Grad_stat\easton\easton.xlsx"
    DBMS=EXCEL REPLACE;
RUN;
proc contents data=easton ; run;
proc print; run;
Data easton1 ; set easton;
if Mo=3 then month='Mar'; else if Mo=4 then month='Apr';
else if Mo=5 then month='May'; else if Mo=6 then month='Jun';
if area=1 then geo='Dallas'; else if area=2 then geo='FortW';
else if area=3 then geo='Other'; else geo=' ';
if agency=0 then realty='Other'; if agency=1 then realty='Easton';run;
proc contents data=easton1; run;
proc print data=easton1 ;run;
proc freq data=easton1;
    tables mo month ; tables brooms ;    tables area geo /missing ;
    tables agency*realty /missing nocol nopercnt /*chisq*/;    run;
proc univariate data=easton1 normal plot ;
var size price;run;
proc sort; by realty ; proc means data=easton1 maxdec=2;
var age price size;by realty;run;
proc sort; by month ;
proc means data=easton1 maxdec=2;var age price size;by month;run;
proc sort; by geo ;
proc means data=easton1 maxdec=2; var age price size; by geo; run;
proc sort; by month ;
proc means data=easton1 maxdec=2;var age price size;by month;run;
proc sort; by brooms ;
proc means data=easton1 maxdec=2;var age price size;by brooms;run;
data easton2;set easton1;
if mo=6 then June=1; else june=0;
if brooms=2 then BR_2=1; else BR_2=0;
if brooms=3 then BR_3=1; else BR_3=0;
if brooms=4 then BR_4=1; else BR_4=0;
if area=1 then Dallas=1;else Dallas=0;
run;
proc contents;run;
proc sort; by realty ;
proc tabulate data=easton2 ;class realty ;var price ;
    table (realty all)*(mean*f=dollar10.2),(price );run;
proc sort; by realty geo;
proc tabulate data=easton2 ;class realty geo;var price ;
    table (realty*geo all)*(mean*f=dollar10.2),(price );run;
proc sort; by realty dallas;
proc tabulate data=easton2 ; class realty dallas; var price ;
    table realty*dallas all)*(mean*f=dollar10.2),(price );run;
proc sort; by realty ;
proc tabulate data=easton2 ;class realty ; var size ;
    table (realty all)*(mean*f=dollar10.2),(size );run;
proc sort; by realty geo;
proc tabulate data=easton2;class realty geo;var size ;
    table realty*geo all)*(mean*f=dollar10.2),(size );run;
```

```

proc sort; by realty June;
proc tabulate data=easton2 ; class realty June; var price ;
    table (realty*June all)*(mean*f=dollar10.2), (price);run;
proc sort; by realty ;
proc anova data=easton2 ;class realty;model price=realty;run;
proc sort; by realty ;
proc anova data=easton2 ;class realty;model size=realty;run;
proc sort; by realty ;
proc anova data=easton2 ;class realty;model age=realty;run;
proc sort; by month;
proc anova data=easton2 ;class month;model price=month;run;
proc sort; by realty ;
proc anova data=easton2 ;class realty;model size=realty;run;
proc sort; by realty ;
proc anova data=easton2 ;class realty;model age=realty;run;
proc sort; by geo ;
proc anova data=easton2 ;class geo;model price=geo;run;
proc sort; by geo ;
proc anova data=easton2 ;class geo;model size=geo;run;
proc sort; by geo ;
proc anova data=easton2 ;class geo;model age=geo;run;
proc sort; by geo realty;proc GLM data=easton2 ;class geo realty;
model price=geo realty;run;
proc reg data=easton2 plots = DFFITS;
model price=June agency age size Dallas BR_2 BR_4 /influence;run;
proc reg data=easton2 plots = DFFITS;
    model price=June agency age size Dallas BR_2 BR_4 /selection=stepwise;run;
proc reg data=easton2 ;    model price=June size Dallas agency ;run;
Data easton3 ; set easton2;if _n_ ne 314;run;
proc reg data=easton3 ;    model price=June size Dallas agency ;run;

```