BU255- Managerial Statistics, Winter 2019
Amjad Rabi
arabi@wlu.ca

Text:
- Black *et al.*, <u>Business Statistics for Contemporary Decision Making</u>, 2nd Edition, Wiley, 2014 (comes with supporting software, WileyPLUS).

Office Hours: Monday 10 am-12 pm. Office: LH2003

Goals: The goal for the semester is to learn, understand and be able to work with descriptive statistics and probability and how and why statistical techniques are applied. This does not only mean that you should be able to work through a bunch of problems similar to ones seen in the homework. But that you should have the ability to articulate the ideas presented in the course in a clear and coherent manner as well. You should also be able to apply a number of different statistical procedures and understand how to use and interpret Microsoft Excel statistical output in ways as it pertains to business and economics.

Expectations: You are expected to do most of your learning outside of the classroom. Statistics, like most subjects, is learned by doing it. There will not be time in class for you to do a lot of statistics yourself. If you must miss a class, you are expected to find out what happened. You are responsible for everything that goes on in class.

Graded Work: the midterm exam is tentatively scheduled for **Friday February 8, 2019 at 6:00-8:00 pm.** Room: P115, P118. The final exam will be between April 10-30, 2019, the exact date will be determined by the registrar. There will be two quizzes and will be announced in class the week before the quiz. Lastly, you are required to develop two formula sheets so that you can use it during exams. Each formula sheet to be turned with midterm and final exams. The allowed paper size is A4.

The weights for each item is as follows:

Midterm Exam (35%)
Two Quizzes (10% each)
Two Formula Sheets (2.5% each)
Final Exam (40%)

Homework: As the name suggests, this is work to be done outside of class. A few of the homework problems may be worked in class either as examples or quizzes. You are encouraged to work with other students on the homework.

Syllabus: Anticipated coverage of the text, subject to change, is as follows:

Week	Dates	Text Coverage

1	Jan 8-10	1.1 Statistics in Business
		1.2 Basic Statistical Concepts
		1.3 Variables and Data
		1.4 Data Measurement
		
		2.1 Frequency Distributions
		2.2 Quantitative Data Graphs (Histograms only)
		
		3.1 Measures of Central Tendency: Ungrouped Data
		       (skip Percentiles and Quartiles)
		3.2 Measures of Variability: Ungrouped Data
		       (skip Interquartile Range)
		       (skip Chebyshev's Theorem)
		3.5 Descriptive Statistics on the Computer
		
		Suggested problems: 1.7-1.9, 2.23, 2.24, 2.25 (only histogram), 3.11 (skip interquartile range), 3.13, 3.18, 3.21, 3.44

2	Jan 15 -17	4.1 Introduction to Probability 4.2 Methods of Assigning Probabilities 4.3 Structure of Probability *(skip Counting the Possibilities)* 4.4 Marginal, Union, Joint and Conditional Probabilities 4.5 Addition Laws 4.6 Multiplication Laws 4.7 Conditional Probability **Suggested problems:** 4.2, 4.3, 4.10, 4.13, 4.16, 4.19, 4.24, 4.27, 4.44
3	Jan 22-24	4.8 Revision of Probabilities: Bayes' Rule 5.1 Discrete versus Continuous Distributions 5.2 Describing a Discrete Distribution 5.3 Binomial Distribution 6.1 Uniform Distribution **Suggested problems:** 5.1, 5.3, 5.5-5.7, 5.10, 5.13, 5.15, 5.16, 5.18
4	Jan 29-31	5.4 Poisson Distribution 6.4 Exponential Distribution 6.2 Normal Distribution

		Suggested problems: 6.1, 6.5-6.7, 6.9, 6.12, 6.26, 6.27, 6.29, 6.40, 6.55
5	Feb 5-7	7.1 Sampling *(skip Random Sampling Techniques)* *(skip Nonrandom Sampling)* 7.2 Sampling Distribution of $\bar{x}$ *(skip sampling from a Finite Population)* 7.3 Sampling Distribution of $\hat{p}$ **Suggested problems:** 7.13, 7.14, 7.21-7.23, 7.26, 7.27, 7.45, 7.49 **Midterm: Friday February 8, 2019 at 6:00-8:00 pm.** Room: P115, P118 Covered Material: From chapter 1 through chapter 6 (included), as stated above.
6	Feb 12-14	8.1 Estimating the Population Mean Using the z Statistic *(skip Finite Correction Factor)* 8.2 Estimating the Population Mean Using the t Statistic 8.3 Estimating the Population Proportion 8.5 Estimating Sample Size **Suggested problems:** 8.1a-c, 8.2-8.4, 8.9, 8.13, 8.15, 8.21, 8.23, 8.25, 8.26, 8.30, 8.34, 8.40, 8.43, 8.47
	Feb 18-22	No Class, Reading Week
7	Feb 26-28	9.1 Introduction to Hypothesis Testing 9.2 Testing Hypotheses about a Population Mean Using the z Statistic *(skip Testing the Mean with a Finite Population)* *(skip Using the Critical Value Method)* 9.3 Testing Hypotheses about a Population Mean Using the t Statistic 9.4 Testing Hypotheses about a Proportion *(skip Using the Critical Value Method)* **Suggested problems:** 9.1a-b, 9.3a-b, 9.5, 9.9, 9.11, 9.16, 9.23, 9.25, 9.27, 9.51a, 9.54, 9.56
8	March 5-7	10.1 Hypothesis Testing and Confidence Intervals About the Difference in Two Means Using the z Statistic 10.2 Hypothesis Testing and Confidence Intervals About the Difference in Two Means: Independent Samples and Population Variances Unknown *(skip the "unpooled" formula 10.4)* 10.3 Statistical Inferences for Two Related Populations 10.4 Statistical Inferences About Two Population

		Proportions, $p_1 - p_2$
		Suggested problems: 10.1 (skip 10.1b), 10.3, 10.7, 10.11, 10.13, 10.17, 10.21, 10.23, 10.24, 10.31, 10.33, 10.35
9	March 12-14	11.1 Introduction to Design of Experiments 11.2 The Completely Randomized Design (One Way ANOVA) 16.1 Chi-Square Goodness-of-Fit Test 16.2 Contingency Analysis: Chi-Square Test of Independence **Suggested problems:** 11.1-11.3, 11.5, 11.7, 16.1, 16.2, 16.6, 16.11-13
10	March 19-21	12.1 Correlation 12.2 Introduction to Simple Regression Analysis 12.3 Determining the Equation of the Regression Line 12.4 Residual Analysis 12.5 Standard Error of the Estimate 12.6 Coefficient of Determination 12.7 Hypothesis Tests of Slope of the Regression Model and Testing the Overall Model **Suggested problems**: 12.1, 12.3, 12.6, 12.8, 12.9, 12.14, 12.16, 12.17, 12.24, 12.26, 12.27, 12.32, 12.34, 12.35, 12.38, 12.40, 12.41, 12.43
11	March 26-28	12.8 Estimation 12.9 Using Regression to Develop a Forecasting Trend Line 12.10 Interpreting the Output 13.1 The Multiple Regression Model 13.2 Significance Tests of the Regression Model and its Coefficients **Suggested problems:** 12.44, 12.46-49, 12.67, 12.68, 13.3, 13.4, 13.7, 13.8, 13.13
12	April 2-4	13.3 Residuals, Standard Error of the Estimate, and R^2 13.4 Interpreting Multiple Regression Computer Output 14.2 Indicator (Dummy) Variables 14.3 Model Building **Suggested problems:** 13.14, 13.15, 13.20, 13.22, 13.23, 14.7, 14.9, 14.10

	April 10-30	**Final Exam** Covered material: From chapter 7 (included) on word, as stated above.

Notes

1- **Calculator Policy:** All are permitted, no restrictions. Manual calculations will be used to determine descriptive statistics and probability. **please bring your calculator in every class and during the exams.**

2- **Microsoft Excel:** This course uses Microsoft Excel for the calculation of most statistics.

3- Any **error in marking** must be reported to your instructor within *one week* of the date the work was returned in class. No marks will be changed after that time. Please see the model solutions posted on MLS before bringing any alleged errors to the attention of your instructor.

4- **Missed Tests:** Tests missed without a *valid, documented excuse* (e.g. medical certificate) will be assigned a mark of zero.

5- **Final Examinations:** Students must reserve the examination period of April 10-30, 2019. If you are considering registering for a special examination or event, you should select a time outside the examination period. Consult Academic Regulations in the Academic Calendar for special circumstances for examination deferment.

6- **Students with disabilities or special needs** are advised to contact Laurier's Accessible Learning Centre for information regarding its services and resources. Students are encouraged to review the Academic Calendar, http://www.wlu.ca/page.php?grp_id=1365&p=5123, for information regarding all services available on campus.

7- **Academic Integrity/Misconduct (cheating, plagiarism):** The University has a defined policy with respect to Academic Misconduct; penalties are severe and enforced at all times. You are responsible for familiarizing yourself with the academic misconduct policy and penalty guidelines, and are cautioned that, in addition to failure in a course, students may be suspended or expelled from the University for academic misconduct, and the offence may appear on their transcripts. The relevant policy can be found at Laurier's academic integrity website along with resources to educate and support you in upholding a culture of integrity; see http://www.wlu.ca/academicintegrity. **Ignorance of Laurier's academic misconduct policy is not a defence.** Academic Misconduct includes transmission or reception of information, or possession of unauthorized information, during laboratories, quizzes, tests, or examinations. Academic Misconduct also includes plagiarism. Wilfrid Laurier University uses software that can check for plagiarism, and students may be required to submit their written

work in electronic form for a plagiarism check. The *Student Code of Conduct and Discipline* and the procedures for investigating and determining appropriate disciplinary measures for breaches of this *Code* are given in the Academic Calendar; see http://www.wlu.ca/page.php?grp_id=2505&p=11452.

8- **Classroom Use of Electronic Devices:** The use of electronic devices in the classroom is governed by WLU Policy 9.3: *Policy on the Classroom Use of Electronic   Devices*;   see: http://www.wlu.ca/documents/50202/9.3_Electronic_Device_Policy.pdf.   Details of this Policy and the consequences of breaches are stated in the Academic Calendar. Mobile devices are permitted in this course provided they do not detract from the learning of any student, for example by noise level or by the display of distracting or disturbing content. Responsibility for enforcing this rule rests with both the instructor and the students.   Students who do not feel comfortable approaching another student can email or talk to the instructor in person. Students who fail to comply with this policy may receive a verbal and/or written warning, or may be asked to leave the classroom for all or part of the course.

Foot Patrol walk home service | 519.886.FOOT (3668)
Foot Patrol is a volunteer operated walk-home service, available daily during evening hours. Male-female, radio-dispatched teams trained in Emergency First Aid are available on request to escort students to and from campus as well as to off-campus destinations, either by foot or by van.

Counselling Services & Peer Help Line | 1-866-281-PEER (7337)
Counselling Services are available to help students deal with emotional, psychological and social challenges of university. Counselling, consultation or referral are available on the 2nd floor of the Student Services Building (across from Health Services), Monday-Thursday 8:30am-8:00pm, Friday 8:30am-4:30pm. Peer Help Line, a confidential listening, referral, information and support line, is available during evening hours to provide support.

Student Food Bank
All Laurier students are eligible to use the Student Food Bank. Anonymous requests can be made online at WLUSU.COM under the Services tab. All dietary restrictions are accommodated, and food hampers typically last up to a week.

For more information visit WLUSU.com