BA 240 Statistical Analysis
Leslie Lum
Fall 2016 MWF Course Syllabus

Textbook: **Statistics** by McClave and Sincich, 12th Edition, Pearson 2013 available for RENT at bookstore
Schedule: (Subject to adjustment – changes will be announced on Canvas – check the site often for announcements for extra credit opportunities)

Week	Topics – READ BEFORE CLASS	Monday	Wednesday	QUIZZES are given on Friday in the last 20 minutes of class
Sep 19	MODULE 1 Read Describing data Chapter 1 Read Chapter 2 including 2.9	PLEASE NOTE THAT THERE ARE SPECIFIC INSTRUCTIONS FOR HOMEWORK THAT MAY BE DIFFERENT FROM THE TEXTBOOK	HW 1 - 1.18, 1.19, 1.24 (Classify quantitative, qualitative, continuous, discrete and **scale**) Solution manuals are available in the Library Media Center and the Business Study Center C207 Text data files are on Canvas	**Quiz 1 (Data classification, Worksheet A summation)**
Sep 26	MODULE 1 MODULE 2 Read Probability 3.1 to 3.7 Read Discrete Probability Distributions 4.1, 4.2, 4.3, 4.4	HW 2- 2.62 Use all 3 data sets Create table with reasonable intervals and frequency, relative frequency and cumulative frequency. Plot stem leaf. Calculate mean, median, mode	HW 3 - 2.136 (FREQUENCY ONLY), 2.153 Use data only. Not necessary to answer question. Create table with reasonable intervals and frequency, relative frequency and cumulative frequency. Plot stem leaf. Calculate mean, median, mode, variance and standard deviation. Complete five number summary. **Choose your teams**	**Quiz 2 (Homework)**
Oct 3	Module 2 Read Normal distributions 5.1, 5.3, 5.4	HW 4 - General Discrete 4.38, 4.44, 4.126 In addition to answering question, plot the entire distribution and show mean and plus and minus 3 std on graph.	HW 5 - Binomial 4.64, 4.65, 4.131 In addition to answering question, plot the entire distribution and show mean and plus and minus 3 std on graph. **Team Contract Due**	**Quiz 3 (Worksheet B General Discrete/Binomial)**
Oct 10	MODULE 2 Chapter 11 – 11.1, 11.2, 11.3	HW 6 Regression 11.121 Worksheet C and D for extra practice (not required)	HW 7 - Normal 5.115, 5.116, 5.117. For all problems, plot the distribution and show mean and plus and minus 3 std on curve on graph.	**Quiz 4 (Regression/Normal – Worksheet C and D)** Test Review: 4.127, 4.128, 4.129, 4.133, 5.122 to 5.147 (Skip 5.130, 5.138, 5.139) Extra Homework credit 1 point for any test review problems prepared last class BEFORE exam up to 10 points for quarter.
Oct 17	MODULE 3 Read Central Limit - 6.1, 6.3	EXAM 1		**Individual Project Excel data set and requirements 1 to 6 checkin – Submit hard copy**

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Oct 24	MODULE 3 Confidence Interval - 7.1, 7.2, 7.3, 7.4, 7.5	HW 8 - Central Limit 6.61, 6.62, 6.66 Plot the distribution and show mean and plus and minus 3 std on curve on graph along with answering the question.	HW 9 - Large sample mean confidence interval Large 7.15, 7.16, 7.22 Small 7.42, 7.43, 7.44 Calculate to actual lower and upper value and INTERPRET correctly.	**Quiz 5 (Worksheet E and Confidence interval)**
Oct 31	MODULE 4 Read One population hypothesis testing - 8.1, 8.2, 8.3, 8.4, 8.5, 8.6	HW 10 - Prop. 7.59, 7.62, 7.64 Calculate to actual lower and upper value and INTERPRET correctly. Sample size 7.80, 7.81, 7.82	HW 11 - Large 8.31, 8.32, 8.33 Small 8.66, 8.67, 8.68 For all hypothesis problems, draw curve, show null hypothesis curve including mean, areas of rejection, decision rule, calculation of test statistic, and draw critical value and p-value. Correct form for conclusion. **Individual Project due**	**Quiz 6 (Hypothesis testing)**
Nov 7	MODULE 4 Read One population hypothesis testing - 8.1, 8.2, 8.3, 8.4, 8.5, 8.6	HW 12 - Prop 8.86, 8.87.8.92 For all hypothesis problems, draw curve, show null hypothesis curve including mean, areas of rejection, decision rule, calculation of test statistic, and draw critical value and p-value. Correct form for conclusion. Test Review problems: 7.115 to 7.138 8.139 to 8.145, 8.147 to 8.151 Extra Homework credit 1 point for any test review problems prepared last class BEFORE exam up to 10 points for quarter.	**EXAM 2**	**No Class**
Nov 14	MODULE 4 and start Module 5 Read: Two populations 9.1, 9.2, 9.3, 9.4, 9.5	HW 13 - Large sample 9.6, 9.14, 9.16 For all problems, draw curve, show null hypothesis curve including mean, areas of rejection, decision rule, calculation of test statistic, and draw critical value and p-value. Correct form for conclusion.	HW 14 - Pooled Variance 9.17, 9.22, 9.23 For all problems, draw curve, show null hypothesis curve including mean, areas of rejection, decision rule, calculation of test statistic, and draw critical value and p-value. Correct form for conclusion.	**Quiz 8 (Two population)**

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Nov 21	MODULE 5 More than two populations Read ANOVA 10.1, 10.2	HW – 15 Paired 9.47, 9.48, 9.49 Prop 9.60, 9.61, 9.62 For all problems, draw curve, show null hypothesis curve including mean, areas of rejection, decision rule, calculation of test statistic, and draw critical value and p-value. Correct form for conclusion.	**Quiz 8 (two population)**	**No Class**
Nov 28	MODULE 5 and 6 Read Linear and Multiple Regression 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 12.1, 12.2, 12.3, 12.4	HW 16 - ANOVA: 10.35, 10.36 Use data set only as two factor ANOVA. For problems, state hypothesis, the decision rule, show calculation of test statistic, and conclusion including p-value		**Multiple Regression Final Project due** **Quiz 9 (Worksheet H, ANOVA)** TEST REVIEW: 9.119 to 9.136 Worksheet G & H (not for credit) Practice Final (not for credit) Extra Homework credit 1 point for any test review problems prepared last class BEFORE exam up to 10 points for quarter. **Final 9:30 am Dec. 7 WEDNESDAY**

Course Requirements	Weight
Exam 1 and 2 are two pages of notes (4 sides 8 ½ X 11) which may NOT include the practice exams and which must be turned in with the exam. 6 pages are allowed for the final. You may use a calculator. Electronics of any kind are prohibited. 2 exams (100 each) and one comprehensive final (125) (Extra Credit does not apply to exams)	325
Regression Project. Detailed instructions and project template on Canvas course site	100
Quizzes (20 points each) 20 minutes in class in the last half hour of Friday and Wednesday for Quiz 8 only (No makeups – highest 8 of 9 taken)	160
Worksheets, participation and attendance. (These will be specified in class) If you miss class, come late or leave early, you will lose attendance points.	up to 45
Homework. You must be in class to get credit for the homework. Homework is due at the beginning of class. Extra credit (Maximum of 10 points) for doing test review questions due at the beginning of the class BEFORE the date of the exam. (No late homework accepted - 2 grace homeworks given) PLEASE NOTE THAT THERE ARE SPECIFIC INSTRUCTIONS FOR HOMEWORK THAT MAY BE DIFFERENT FROM THE TEXTBOOK	140
Extra credit – 5 points for attending approved college speakers and writing a 500-word paper due one week after the event.	
TOTAL	up to 770

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Contact

Best to message through Canvas. I will try to respond within 48 hours. If I don't, please message again. Emails do get waylaid.

Telephone: 425-564-4063
Email: llum@bellevuecollege.edu

Office hours

Office Location C207
Lum Office Hours: MW at 1:30 pm, T TH 9:30 am or by appointment

Math 138 is required for this course. BA 240 transfers as STATS 311 at UW and is a rigorous 300 level course that requires your full participation in class and on your own time.

Time and place

Time: Monday/Wednesday 10:30 to 12:20 Friday 10:30 am

Websites

All practice exams keys and assignments are placed on the bc.instructure.com class website.
Extensive videos and other materials are linked below
Complete instructions on the Project are on bc.instructure.com in the Project file.

Required Texts

Statistics by McClave and Sincich, 12th Edition, Pearson 2013
(This book may be rented from the bookstore)
The **textbook data files** are posted in a zip file in Canvas.

Other Requirements

Calculator that can calculate standard deviations.
No electronics are allowed in class. Your undivided attention is needed to get through the material.

Goals

- Research and understand the nature of information and large data sets.
- Calculate solutions to statistical problem sets including measures of central tendency, measures of variability, probability, binomial distributions, normal distributions, confidence intervals, hypothesis testing, correlation, and regression.
- Use software to solve statistical problems.
- Communicate data effectively with written and visual display.
- Apply statistical analysis to real data including framing the problem, sorting data, selecting appropriate statistical formulae, and coming up with relevant conclusions.
- Work in teams to complete projects.

Resources

The solution manual is available at the Business Study Center in C207K. The best students **make extensive use of the study center**. Check C207K for hours.
Review sessions may be scheduled prior to exams. These are often conducted by instructors in other sections. Attend the review sessions to help you do better in the exams.

How to succeed in this course

- This course requires that you work in teams for a project. Teams will be selected by the instructor and you will be expected to behave according to professional workplace standards in dealing with your team members. This includes in-class, out-of-class, and in email communication.
- Review all materials for a module answering the questions on your reading guide BEFORE we cover the module. You will be tested on your reading on the individual and team RAT.
- We will spend two to three sessions on each module applying the concepts that you have learned.
- The Team Project requires that you apply what you learn to real problems or issues. This requires that you apply research, analysis and evaluation skills that will be required in your professions. Your grade on the team project will be adjusted based on peer evaluation.

You must take **personal responsibility** for your learning to succeed in life:

- Attend all classes and participate fully in the team process
- Use the reading guide to read textbook sections, view video lectures and do homework

before and during Module work WITHOUT the solution guide.
- Help your team members learn. You learn the most when you teach others the concepts.
- Do test review and worksheet
- Do practice exams without consulting key

Grading Guidelines

93 - 100%	A	4
90 - 92	A-	3.7
86 - 89	B+	3.3
83 - 85	B	3.0
80 - 82	B-	2.7
76 - 79	C+	2.3
73 - 75	C	2.0
70 - 72	C-	1.7
66 - 69	D+	1.3
60 - 65	D	1.0
Below 60	F	0

A pass grade will not be given unless <u>all requirements</u> of the course are completed.

Standard of Behavior

All interactions will be evaluated as to whether they are acceptable in the business environment. This includes interactions in the class, on online discussion forums, email communications, with the instructor, with fellow students, and in the community. Inappropriate communications include jokes and discussions your classmates find offensive, excessive messages, and other communications which would be typically deemed inappropriate in the workplace. The student will be informed and expected to comply with requests for change and improvement. <u>Cell phone and laptops are not to be used in the class</u>.

Student Code

Cheating includes, but is not limited to, copying answers on exams, glancing at nearby exams, turning in assignments or papers that have been used in other classes, and giving or receiving help during an exam. Cheating includes, but is not limited to, purchasing or selling notes, assignments or examination materials. <u>Having a cell phone in view for any reason during an exam will result in a zero in the exam.</u>

Stealing includes, but is not limited to, taking the text, notes, exams, library books or other personal property of others without their permission.

Plagiarism is presenting the words, ideas, and/or work of others as if it is an individual's own work. It includes, but is not limited to, using other's papers as one's own and including parts of published works without giving credit where credit is due.

If you choose to cheat, steal or plagiarize, or if you assist anyone in cheating, the following actions will be taken:
You will receive zero on the assignment or assessment.
A report of the incident will be forwarded to the Dean of Student Services. He/she may file the report in your permanent record and/or take further disciplinary action.
If you feel you have been unfairly accused of any of the above, you may appeal. For a description of due process, see WAC 132H-120, available in the Dean's office.

"Cheating, stealing and plagiarizing (using the ideas or words of another as one's own without crediting the source) and inappropriate/disruptive classroom behavior are violations of the Student Code of Conduct at Bellevue College. Examples of unacceptable behavior include, but are not limited to: talking out of turn, arriving late or leaving early without a valid reason, allowing cell phones/pagers to ring, and inappropriate behavior toward the instructor or classmates. The instructor can refer any violation of the Student Code of Conduct to the Vice President of Student Services for possible probation or suspension from Bellevue College. Specific student rights, responsibilities and appeal procedures are listed in the Student Code of Conduct, available in the office of the Vice President of Student

Services." The Student Code, Policy 2050, in its entirety is located at: http://bellevuecollege.edu/policies/2/2050_Student_Code.asp

Affirmation of Inclusion

Bellevue Community College is committed to maintaining an environment in which every member of the campus community feels welcome to participate in the life of the college, free from harassment and discrimination. We value our different backgrounds at BC, and students, faculty, staff members, and administrators are to treat one another with dignity and respect.

Code of Honor

By being a student in this course you acknowledge that you are a part of a learning community at Bellevue College that is committed to the highest academic standards. As a part of this community, you pledge to uphold the fundamental standards of honesty, respect, and integrity, and accept the responsibility to encourage others to adhere to these standards.

Accommodations

The Disability Resource Center serves students with a wide array of learning challenges and disabilities. If you are a student who has a disability or learning challenge for which you have documentation or have seen someone for treatment and if you feel you may need accommodations in order to be successful in college, please contact DRC as soon as possible.

If you are a person who requires assistance in case of an emergency situation, such as a fire, earthquake, etc, please meet with your individual instructors to develop a safety plan within the first week of the quarter.

The DRC office is located in B 132 or you can call at 425.564.2498. Deaf students can reach us by video phone at 425-440-2025 or by TTY at 425-564-4110. Application information and other helpful links at www.bellevuecollege.edu/drc

Public Safety

The Bellevue College (BC) Public Safety provides personal safety, security, crime prevention, preliminary investigations, and other services to the campus community, 24 hours per day, 7 days per week. Their phone number is 425.564.2400. Public Safety is located in K100 and on the web at: http://bellevuecollege.edu/publicsafety/ for campus emergency preparedness information, campus closure announcements and critical information in the event of an emergency.

Participating in Business Learning Community

If you intend to and have not already done so, declare your business major. Make sure you have consulted with an advisor and laid out your courses. The Business Transfer Program recommends that you connect with Bellevue College Business Leadership Community via facebook to keep current on events and support for your business school application.

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LINKS TO RESOURCES	Power Point	Sample Excel Spreadsheets	VIDEO LECTURES	VIDEO PROBLEMS AND EXCEL DEMOS
Module 1 - Chapter 1, 2	Module 1	Car file data for Excel 1 Car file Demo Histogram Histogram/Normality	Module 1 Part 2 Communicating Data Module 1 Part 3 Graphs Module 1 Part 4 Central Tendency/Variability Module 1 Part 5 Linear Regression	Mean Median Mode Stem Leaf Problem 2.37 Excel Histogram Excel Central Tendency and Variability Excel Simple Linear Regression
Module 2 - Chapter 3, 4, 5	Module 2	z and t table Noncumulative Binomial Table	Module 2 Part 1 Probability Module 2 Part 2 General Discrete Module 2 Part 3 Binomial Module 2 part 4 Normal	General Discrete Problem 4.11 Mean and Standard Deviation Binomial Problem 4.115 Normal Distribution 5.37 Excel Normality Plot
Module 3 - Chapter 6, 7	Module 3	7.22 7.40	Module 3 Part 1 Central Limit Theorem Module 3 Part 2 Confidence Interval	Large Sample Means Confidence Interval Problem 7.22 Small sample means Confidence Interval Problem 7.40 Large sample proportion Confidence Interval Problem 7.48 Excel Random Sampling Excel Confidence Interval
Module 4 - Chapter 8 **Module 5 - Chapter 9, 10**	Module 4 Module 5	9.122	Module 4 Part 1 One sample hypothesis testing Module 5 Part 2 Two sample hypothesis testing Module 5 Part 3 ANOVA	One pop. large sample Problem 8.34 One pop. small sample Problem 8.61 One pop. proportion Problem 8.79 Two pop. pooled variance Problem 9.19 Two pop. proportion Problem 9.61 Two pop. paired Problem 9.122 ANOVA Problem 10.33
Module 6- Chapter 11, 12, 13	Module 6	Prediction Interval Chi Square	Module 5 Part 1 Multiple Regression Module 5 Part 2 Simple Chi Square Module 5 Part 3 Chi Square	

Module	Knowledge DESCRIBE what the	Comprehension IDENTIFY	Application USE	ANALYZE (hand, TI-83 and Excel)	CREATE (using Excel) TEAM PROJECT	EVALUATE

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	following are:					
MODULE 1 Communicating Data	descriptive and inferential statistics sample, random qualitative and quantitative data continuous and discrete nominal, ordinal, interval and ratio data histogram, pie chart, scatter plot, simple linear regression, box plot and stem leaf mean, median, mode minimum, maximum, range, standard deviation (sum of squares) Percentile, z-score, outliers Skewness, kurtosis Summation	Classify data by qualitative, quantitative, continuous, discrete, nominal, ordinal, interval and ratio Identify mean, median and mode in a data set Identify minimum, maximum, range Describe what a histogram, pie chart, scatter plot, box plot and stem leaf shows. Describe what a linear regression is.	Calculate mean, median, mode, variance, min, max, range, standard deviation, percentile, or z-score for a data set of up to 25. Create a histogram, pie chart, scatter plot, or stem leaf with proper labeling from a data set of up to 25. Hand calculate simple linear regression including correlation and R square for a data set of up to 12.	Interpret mean, median, mode, variance, standard deviation, percentile, z-score relative to each other and what they mean for the population.	Select a set of more than 50 data. Generate descriptive statistics on Excel and interpret what it says about the data set. Organize visual display to effectively communicate what the data shows.	Compare and analyze various kinds of visual display of data. Compare and contrast measures of central tendency and variation and their implications to the data. Predict from visual display. Identify the limitations of data.
MODULE 2 Describing populations	General discrete probability distributions. (Expected value or mean, standard deviation) Binomial probability distribution (mean and standard deviation). Trees (Bayesian).	Describe general discrete probability distribution. Give the formula for the mean/expected value and the standard deviation. List the three conditions of a binomial distribution. Give the formula for binomial, mean, and standard deviation.	Create a general discrete table from data, plot the graph, calculate the mean and standard deviation. Create a binomial table from data, plot the graph, calculate the mean and	Place mean and standard deviation on general discrete probability plot. Calculate binomial. Apply the empirical rule.	Create probability distributions. Construct normality plot. Calculate probability for various z-scores.	Compare discrete distributions. Evaluate normality.

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	Normal probability distribution. Standard normal curve.	Explain the empirical rule and how it relates to normal distributions.	standard deviation. Identify normal probability distributions and do tests for normality. Calculate x and z and find probabilities using the z-table.			
MODULE 3 Estimation	Define central limit theorem, standard error, and sampling error. Define confidence level, alpha, and confidence intervals. Define margin of error. Explain what a t distribution is and when you use it.	Describe the central limit theorem and the relationship between the population and the sample means curve. Define standard error. Define confidence interval. Define sampling error.	Identify which should be used in large sample, small sample and large sample proportion. Apply t distribution and probability. Identify the margin of error. Describe the effect that sample size has on accuracy.	Calculate probability for the sample means curve. Calculate confidence intervals. Differentiate between t and z distributions. Calculate the sample size necessary for a margin of error.	Interpret confidence intervals. Evaluate whether two populations are the same.	Evaluate and interpret polls. Identify the limitations of polls. Evaluate the predictive quality of polls.
MODULE 4 and 5 Hypothesis testing	Null hypothesis. Alternate hypothesis. Alpha. One-tail Two-tail One population Two population Critical t or z p-value	Define null. Define alternate. Type 1 and type 2 error. Setting alpha. Decision rule. Critical z or t.	Classify problem as large, small, proportion, pooled variance and unequal variance. Identify critical z or t.	Calculate test statistic. Find p-value.	Interpret test statistic. Evaluate p-value.	Analyze the cost of type 1 and type 2 error. Evaluate and improve on actual studies.
Analysis of Variance More than two populations	Null hypothesis Alternate hypothesis Test statistic (F statistic	Define null. Define alternate. F-statistic.	Classify as one or two factor ANOVA. Checking ANOVA assumptions.	Calculate F-statistic. Find p-value.	Interpret test statistic. Evaluate findings.	Evaluate use of ANOVA and follow-on tests.
MODULE 6 Linear and Multiple	Dependent variable. Independent variable. Intercept	Identify, define and discuss intercept, slope, residual, correlation, r-	Identify if regression is appropriate for the data.	Calculate intercept, slope, correlation, Rsquare, prediction,	Interpret results.	Evaluate if data transformation is necessary.

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Regression	Slope Residual Correlation R square Prediction Prediction interval Confidence interval Assumptions (mean equal 0, variance equal, variance constant, normal) Outlier removal	square.	Describe the relationship between x and y.	prediction interval, confidence interval.		Provide predictions from the analysis.
Chi-square **Read 13.2, 13.3, 13.4**	Contingency table Null hypothesis Alternate hypothesis Test statistic Observed frequency Expected frequency	Identify null and alternate		Calculate expected frequency. Calculate chi-square.	Interpret results.	Evaluate the usefulness of test.