			Grading:		
Professor:	Karl Majeske	E-mail: majeske2@oakland.edu	**Grading:**	Homework	22%
Office:	423 Elliott Hall	Office Phone: 248-370-4976		Quizzes	50%
Office Hours:	Mon 2-3, Wed 2-3	Fax: 248-370-4275		Final Exam	28%

Book: *Applied Statistics in Business and Economics 4th or 5th Edition*, Doane and Seward

DATE	TOPIC	TEXTBOOK	HOMEWORK DUE	LECTURE NOTES
Jan 3	L1: Hypothesis Testing	Chp 9		1 - 8
Jan 5	L2: p-values	Chp 9		9 - 13
Jan 8	L3: Two Sample Hypothesis Tests - Means	Sec 10.1, 10.2		14 - 21
Jan 10	L4: Small Two Sample Hypo Tests - Means	Sec 10.2	HW 1	22 - 29
Jan 12	L5: Paired t Test	Sec 10.4		30 - 36
Jan 15	*MLK Day - No Class*			
Jan 17	L6: Two-Sample Test - Proportion	Sec 10.5		37 - 42
Jan 19	L7: Two-Sample Test - Variances	Sec 10.7	HW 2	43 - 50
Jan 22	**Quiz 1: L1 -> L6**			
Jan 24	L8: One-Factor ANOVA	Sec 11.1, 11.2		51 - 60
Jan 26	L9: Tukey's Test	Sec 11.3		61 - 66
Jan 29	L10: Components of Variance	Sec 11.4	HW 3	67 - 73
Jan 31	L11: Two-Factor ANOVA	Sec 11.5, 11.6		74 - 81
Feb 2	L12: Correlation	Sec 12.1		82 - 88

Revised: 12-26-17

DATE	TOPIC	TEXTBOOK	HOMEWORK DUE	LECTURE NOTES
Feb 5	L13: Simple Regression	Sec 12.2, 12.3, 12.6	HW 4	89 - 97
Feb 7	**Quiz 2: L7 -> L12**			
Feb 9	L14: Inference on Slope Parameter	Sec 12.5		98 – 102
Feb 12	L15: Residual Analysis	Sec 12.4, 12.8		103 - 112
Feb 14	*No Class*		HW 5	
Feb 16	*No Class*			
Feb 19 – 23	*Winter Break – No Class*			
Feb 26	L16: Model Assessment	Sec 12.9		113 - 120
Feb 28	L17: Predictions	Sec 12.7		121 - 127
March 2	L18: Multiple Regression	Sec 13.1, 13.2, 13.3, 13.8		128 - 136
March 5	L19: Multiple Regression Prediction	Sec 13.4	HW 6	137 - 144
March 7	**Quiz 3: L13 -> L18**			
March 9	L20: Non-linear Models	Sec 12.10, 13.6, 14.2		145 - 150
March 12	L21: Qualitative Ind Variables	Sec 13.5		151 - 155
March 14	L22: Mixed Regression Models	Sec 13.5	HW 7	156 - 163
March 16	L23: Partial F-test			164 - 169

DATE	TOPIC	TEXTBOOK	HOMEWORK DUE	LECTURE NOTES
March 19	L24: Time Based Data	Sec 14.1, 14.2, 14.6		170 - 176
March 21	L25: Constructing Indices	Sec 14.7	HW 8	177 - 184
March 23	**Quiz 4: L18 -> L24**			
March 26	L26: Forecasting	Sec 14.3, 14.4, 14.5		185 - 194
March 28	L27: Chi-squared Distribution	Sec 15.1		195 - 202
March 30	L28: One-way Tables	Sec 15.2, 15.3	HW 9	203 - 207
April 2	L29: Goodness-of-fit tests	Sec 15.4, 15.5		208 - 213
April 4	L30: Contingency Tables	Sec 15.1		214 - 220
April 6	L31: Wilcoxon Signed Rank Tests	Sec 16.1, 16.3	HW 10	221 - 228
April 9	**Quiz 5: L25 -> L31**			
April 11	L32: Multiple Sample Nonparametric Tests	Sec 16.4, 16.5		229 - 235
April 13	L33: More Nonparametric Tests	Sec 16.2, 16.7		236 - 242
April 16	Review for Final Exam		HW 11	

Final Exam   10:40 Class (CRN 11075): Monday April 23, 2018   noon – 3pm

Noon class - (CRN 10457): Wednesday April 25, 2018   noon – 3pm

Weather Policy:
Class will meet on the days scheduled unless the University is closed. In the event the University closes for a day due to weather or other circumstances, the lecture schedule will be modified and posted to Moodle.

Lecture Attendance Policy:
The notes for each lecture have been posted to Moodle. The best way to cover the course material is to attend lecture and work along as we solve problems. As such, attendance in lecture is not required; rather, it is strongly encouraged. In the event a student misses a lecture, it is their responsibility to make-up any material.

Homework Policy:
All Homework (HW) assignments for the term will be posted to Moodle. HW is due at the beginning of class on the due date noted on the syllabus whether you are in class that day or not. If a student is not in class on a due date, HW may be submitted as an email attachment (in a single file formatted to print). In general, late HW is not accepted. Arrangements to submit HW late must be made in advance and will be subject to a late penalty. No points will be awarded to HW submitted after a solution has been posted to Moodle for any reason. Each HW is worth 20 points for a total of 220 points for homework that represents 22% of the semester grade. HW points will be awarded for completing problems; however, the student must show work to get points for HW problems. Detailed solutions to HW will be posted to Moodle. It is the student's responsibility to compare their Homework to the solution posted on Moodle to determine if problems were solved correctly.

Quiz Policy:
Quizzes will be taken in-class on the dates listed in this syllabus. The quiz will begin at the time the class is scheduled to meet and you will be allowed one hour to complete the quiz. In the event a student must miss class on the day of a Quiz for a prescheduled University related conflict, the student must take the quiz prior to the scheduled time. In the event a student must miss a Quiz, the student must notify the instructor prior to the scheduled quiz time. To arrange for a make-up quiz the student must provide supporting documentation for the reason you missed the quiz (e.g., a note from a doctor saying you were too sick to be in class that day). Quizzes will contain problems that require a detailed solution. During the quiz a student will be allowed to use: one 8.5" by 11" page of notes (writing allowed on both sides), copies of tables from the textbook (e.g., Z, t, F, Chi-square, Tukey, Hartley) passed out in class and a calculator. Each Quiz will be graded out of 100 points and problems will be graded for partial credit. No points will be awarded for problems left blank. The five quizzes total 500 points that represent 50% of the semester grade.

Final Exam:
The dates and times for Final Exams have not yet been scheduled by OU. The final exam will consist of 40 multiple choice and true / false questions. You will place your answers on a Scantron answer sheet. Each question will have only one correct answer and no partial credit will be given for incorrect answers. Only answers on the Scantron answer sheet will be graded. During the final exam a student will be allowed to use their textbook, lecture notes, homework assignments, homework solutions, any other notes prepared for the final exam and a calculator. The final exam will be graded out of 280 points that represents 28% of the semester grade.

Semester Grading:
The course will be graded out of 1000 points total. Each HW is graded out of 20 points for a total of 220 points for homework that represents 22% of the semester grade. Each of the five Quizzes will be graded out of 100 points for a total of 500 points that represents 50% of the semester grade. The final exam will be graded out of 280 points that represents 28% of the semester grade. All HW, Quiz and exam scores will be posted to Moodle. Semester grades are determined using the Course Total field in Moodle (percentage of points) using the table below.

Course Total	Semester Grade	Course Total	Semester Grade	Course Total	Semester Grade	Course Total	Semester Grade
99 - 100	4.0	83 - 84	3.2	74	2.4	66	1.6
97 - 98	3.9	81 - 82	3.1	73	2.3	65	1.5
95 - 96	3.8	80	3.0	72	2.2	64	1.4
93 - 94	3.7	79	2.9	71	2.1	63	1.3
91 - 92	3.6	78	2.8	70	2.0	62	1.2
89 - 90	3.5	77	2.7	69	1.9	61	1.1
87 - 88	3.4	76	2.6	68	1.8	60	1.0
85 - 86	3.3	75	2.5	67	1.7	0 - 59	0.0

QMM 241 Syllabus Supplement
University General Education Requirement

This course is a continuation of QMM 240, covering analysis of variance, nonparametric statistics, correlation, regression, statistical process control, and time series analysis. Emphasizes business applications and computer analysis of data. Includes report writing, computer projects, and presentations. Its prerequisites are MTH 122 or 154, and QMM 240 or equivalent, with a minimum grade of 2.0 in each course. MTH 122 is a knowledge foundation area in the General Education Program. QMM 241 satisfies Oakland's General Education requirements in the *knowledge applications* area by demonstrating how knowledge in a field outside of the student's major can be evaluated and applied to solve problems across a range of applications, and knowledge of the personal, professional, ethical and societal implications of these applications. QMM 241 seeks to help the student:

- Recognize data that requires analysis of variance, use computer tools to calculate and interpret ANOVA results, and understand the assumptions underlying ANOVA.

- Recognize the purposes non-parametric tests and perform a few common tests using the computer.

- Use regression terminology correctly, analyze bivariate data (scatter plots, correlation, simple regression), and know the assumptions of least-squares regression.

- Fit trends and make forecasts from time series data using appropriate computer tools.

- Estimate a multiple regression, perform significance tests, and interpret the results. Understand the importance of data conditioning, know when a model may be over-fitted and why that can be a problem, and perform diagnostic tests for model adequacy (multicollinearity, residual tests, leverage).

- Interpret common process control charts and apply simple pattern recognition rules to detect out-of-control processes.

- Use computers confidently, write effective technical reports, and work effectively with a team

By applying methods taught in the MTH 121 prerequisite course, QMM 241 builds on concepts such as linear equations, independent and dependent variables, algebraic functions, graphs, and exponential functions and compound interest in linear trend models of time series data. Students apply MTH 122 concepts of derivatives in interpreting time series growth models, partial derivatives in interpreting regression models, and integrals as areas under curves to interpret tables of critical values and p-values in significance tests. Students apply QMM 240 concepts such as descriptive statistics, probability distributions, confidence intervals, and hypothesis tests in more complex applications (e.g., analysis of variance, nonparametric tests, and regression). QMM 241 builds upon the student's course in information technology MIS 100 (or CSE 125 or MIS 200) for applications of desktop software (Excel, Word, PowerPoint) to do calculations, write reports, and/or prepare class presentations. QMM 241 applies knowledge in a field outside of the student's major area of study by applying methods taught in the prerequisite courses (MTH 122 and QMM 240) and their prerequisites MTH 121 and CSE 125 (or MIS 100 or MIS 200).

The cross-cutting capacity is *critical thinking*. Students learn to find patterns and identify relationships among variables in complex data sets, estimate and apply regression models, look for anomalies in regression results (e.g., unusual residuals, high leverage, collinearity, non-normal residuals, heteroscedasticity, or autocorrelation). Students learn to apply tools such as ANOVA and regression to problems in business, economics, and not-for-profit organizations. Because this course applies knowledge from prerequisite courses along with methods taught in this course to problems of societal importance and managerial decision making, its content enhances students' critical thinking skills. Students also learn to avoid common pitfalls in reasoning from data (e.g., improper uses of regression, failed assumptions, misinterpretation of hypothesis tests or *p*-values, recognition of the limitations of regression). Writing is not a major component of this course, but instructors will assign written individual or team homework exercises and/or computer projects.

Revised February 8, 2007