QMM 2410: Statistical Methods for Business II
Winter 2018

Date and Time	M-W 1:00-2:15 pm
Classroom	EH 214
Professor	Yazan Roumani
Office	342 Elliot Hall
Office hours	M-W 11:30-12:30 or by appointment
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Course Description:

Continuation of QMM 2400. Analysis of variance, nonparametric statistics, correlation, regression, and time series analysis. Emphasizes business applications and computer analysis of data. Satisfies the university general education requirement in the knowledge applications integration area. Prerequisite for knowledge applications: completion of the general education requirement in the formal reasoning knowledge foundation area.
Prerequisite(s): (MTH 1222 or MTH 1554) and (STA 2220 or STA 2226 QMM 2400) with a minimum grade of 2.0 in each course, and sophomore standing.

Learning Objectives:

The objective of this course is to understand the role of statistics in the decision-making process of a business environment. At the end of the course, students should understand the following topics:
- Recognize data that requires analysis of variance, use computer tools to calculate and interpret ANOVA results, and understand the assumptions underlying ANOVA
- 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)

Textbook: Applied Statistics in Business and Economics 5th Edition, Doane and Seward

Performance Evaluation:

Participation and in-class exercises	5%
Homework Assignments	20%
Quizzes	20%
Exam 1	15%
Exam 2	15%
Final Exam (comprehensive)	25%

- **No make-up homework assignments, quizzes or exams will be given**
- **No incomplete grades will be given**

Grading:

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

Homework:
Homework assignments must be done independently. Late assignments will not be accepted. Late or missed assignments will result in a grade of 0 for the assignment. In general, there will be no make-up homework assignments. In the event that extraordinary circumstances prevent you from doing the homework assignment, you must contact the instructor _prior_ to the due date and present the proper documentation. No copying problem solutions from solution manuals. Cheating will result in a grade of 0 for the applicable homework assignment; further disciplinary actions might also be taken.

Quizzes:
All quizzes will be conducted online at: https://moodle.oakland.edu/login/index.php. Quizzes are open book and open notes but must be done independently. Quizzes should be completed within the specified time frame. Missed quizzes will result in a grade of 0 for the quiz. In general, there will be no make-up quizzes. In the event that extraordinary circumstances prevent you from taking the quiz, you must contact the instructor _prior_ to the quiz deadline and present the proper documentation. Cheating will result in a grade of 0 for the applicable quiz; further disciplinary actions might also be taken.

Exams:
All exams will be conducted in class (closed book, closed notes). You will be allowed to bring a calculator and one 8.5" x 11" sheet to the exam (no attachments or layers allowed). No cell phones or any other electronic devices allowed. You will not be permitted to start the exam after anyone has left the room. In general, there will be no make-up exams. In the event that extraordinary circumstances prevent you from taking the exam at the scheduled time, you must contact the instructor *prior* to the examination and present the proper documentation. Cheating will result in a grade of 0 for the applicable exam; further disciplinary actions might also be taken.

Important deadlines:

Add/drop deadline: January 17th
Withdrawal deadline: March 14th

Classroom Conduct:
You are expected to arrive on time and be prepared for every class. Make sure you print PowerPoint slides and tables posted on Moodle before coming to class. If you need to leave early, you should let the instructor know before class. No talking with other students during class. It is distracting to students around you and to the instructor. You will be asked to leave the classroom if you engage in conversation with other students. Please make sure your phone is turned off. No texting, napping or Internet browsing during class. Engaging in any of the above mentioned activities will negatively affect your participation grade.

Attendance:
Attendance is critical to success in the course. If you are unable to attend class, you are responsible for completing the material covered on the syllabus.

Academic Integrity:
Cheating on examinations, plagiarism, falsifying reports/records, and unauthorized collaboration, access, or modifying of computer programs are considered serious breaches of academic conduct. Please review Oakland University's Academic Conduct policy. Any indication of academic misconduct (cheating, plagiarism, etc.) will be reported to the Office of the Dean of Students to evaluate.

Statement Regarding Students with Disabilities:
The Office of Disability Support Services (DSS) is the campus office responsible for verifying that students have disability related needs for academic accommodation and for planning appropriate accommodations. Students with learning, psychological or physical disabilities who need academic accommodations can contact DSS in room 103A North Foundation Hall (Phone: 248-370-3266; TYY: 248-370-3268)

Tentative Schedule

Week	Date	Topic
1	1/3	Chapter 9 (One-Sample Hypothesis Tests)
2	Week of 1/8	Chapter 9 (One-Sample Hypothesis Tests) & Chapter 10 (Two-Sample Hypothesis Tests)
3	**1/15**	**No class – Martin Luther King, Jr. Day**
	1/17	Chapter 10 (Two-Sample Hypothesis Tests)
4	Week of 1/22	Chapter 10 (Two-Sample Hypothesis Tests)
5	Week of 1/29	Chapter 10 (Two-Sample Hypothesis Tests) & Chapter 11 (Analysis of Variance)
6	Week of 2/5	Chapter 11 (Analysis of Variance) & Exam 1 review
7	**2/12**	**Exam 1**
	2/14	Chapter 12 (Simple Regression)
8	**Week of 2/19**	**No class – Winter Recess**
9	Week of 2/26	Chapter 12 (Simple Regression)
10	Week of 3/5	Chapter 12 (Simple Regression) & Chapter 13 (Multiple Regression)
11	Week of 3/12	Chapter 13 (Multiple Regression) & Chapter 14 (Time-Series Analysis)
12	Week of 3/19	Chapter 14 (Time-Series Analysis)
13	3/26	Exam 2 review
	3/28	**Exam 2**
14	Week of 4/2	Chapter 15 (Chi-Square Tests)
15	Week of 4/9	Chapter 16 (Nonparametric Tests)
16	4/16	Final Exam review
		Final Exam **Monday (4/23)** **3:30-6:30 PM**

QMM 2410 Syllabus Supplement - University General Education Requirement

This course is a continuation of QMM 2400, 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 2400 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 2410 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 2410 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 2410 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 2400 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 2410 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 2410 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 2400) 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*