

# QMM 240 – Business Statistics I

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<b>Office Hours:</b> M, W 3:30-4:30 and by appt <b>My Office:</b> 317 Elliott Hall	<b>Class Meeting Time and Location</b> CRN 10965 MWF 12:00p-12:50a in 302 Pawley Hall (PH)

## Course Description

QMM 240 is the first of two quantitative methods courses you will take in the SBA. In QMM 240 we will cover probability and basic classical statistics (data, data visualization, descriptive statistics, estimation, confidence intervals and hypothesis testing). Our focus will be on developing a solid foundation for the practical application of quantitative analysis techniques in business. Businesses are swimming in data. The ability to analyze data to help improve decision making in business is a critical and valuable skill. There will be an emphasis on learning how computing supports analysis in business through hands on exercises and classroom demonstrations.

## Course Materials

Textbook: Applied Statistics in Business and Economics by Doane and Seward (3rd edition)

Software: We will use Excel, MegaStat (an Excel add-in), LearningStats, SPSS, and @Risk. All of these packages are installed on all machines within the SBA.

Course Webs: The course website is available through Moodle (<http://moodle.oakland.edu>). It will be used for announcements, distribution of lecture notes, homework, handouts and other materials. This syllabus is available on the course web. Get used to checking it frequently.

## Course Delivery

Lectures will consist of presentation and discussion of important concepts, working of example problems, demonstrations of concepts using Excel, MegaStat or other software tools. Skeleton 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 fill in the blanks in the lecture notes and solve problems together. 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.

## Performance Evaluation

There are four components that are weighted as follows for grading purposes.

Homework Assignments	20%
Online Quizzes	10%
Hourly Exam 1	15%
Hourly Exam 2	15%
Hourly Exam 3	15%
Cumulative Final Exam	25%

The following scale will be used for determining minimum final grades.

Score	Grade	Score	Grade	Score	Grade	Score	Grade	Score	Grade	Score	Grade
0.986	4	0.886	3.5	0.796	3	0.746	2.5	0.696	2	0.646	1.5
0.966	3.9	0.866	3.4	0.786	2.9	0.736	2.4	0.686	1.9	0.636	1.4
0.946	3.8	0.846	3.3	0.776	2.8	0.726	2.3	0.676	1.8	0.626	1.3
0.926	3.7	0.826	3.2	0.766	2.7	0.716	2.2	0.666	1.7	0.616	1.2
0.906	3.6	0.806	3.1	0.756	2.6	0.706	2.1	0.656	1.6	0.606	1.1
										0.596	1

## Homework Assignments (20%)

Consistent problem solving practice is integral to learning mathematical and statistical concepts. So, we will have weekly homework assignments. You can discuss and consult with your classmates, but each assignment must be completed and turned in individually.

"Hard copy" (i.e. paper) of your completed assignment will be collected on Wednesday of most weeks. If you are not in class, you may submit an electronic version of your homework (e.g. Word document or scanned version of your handwritten document) via Moodle. Sometimes the assignment will involve computer work and you will submit your files via Moodle. Note that the assignment is still due by end of class on Wednesday regardless of method you use to submit it. It is important to "show your work" on each assignment so that partial credit may be earned and so that I can see how you arrived at your final answer. Turning in a list of final answers for each problem with no supporting work is unacceptable.

## Late Assignment Policy

Late assignments will be penalized 25% if you turn in an assignment anytime after 1pm the day that it was due. If you turn it in the day after its due you will lose 50% of the maximum score. Beyond the day after it's due, I will not accept it at all since I want to be able to post solutions two days after the assignment is due.

## Online Quizzes (10%)

These are 5 minute quizzes administered via Moodle. They will cover important concepts from the material being covered. You'll usually have a 2-3 day window to complete the quiz. You get one attempt on each quiz.

## Exams (70%)

The three hourly exams are each worth 15% and the final cumulative exam is worth 25%. The exams will focus on important concepts discussed in class and reinforced through homework assignments and practice problems.

## Ethics

Ethics is a fundamental business concept. The standards of conduct by which one's actions are judged right or wrong, honest or dishonest, fair or unfair, are called *ethics*. Please read and comply with the university's policy on academic conduct (i.e., ethical behavior). It is printed in the undergraduate catalogue. For this course, unaided individual work is expected for examinations. For individual homework assignments you may discuss problems with your classmates but everyone must do and turn in their own work.

## Tentative Schedule of Topics (see Moodle)

WEEK	DATE	TOPIC	TEXTBOOK
1	Wed 1/5	Intro to Business Statistics	Ch1: All
1	Fri 1/7	Data Collection and Manipulation	Ch2: All
2	Week of 1/10	Data Collection/Data Visualization	Ch3: All
3	Week of 1/17	Descriptive Statistics	Ch4: All
4	Week of 1/24	Probability Intro, Conditional and Joint Probability, Independence	Ch 5.1-5.5
<b>5</b>	<b>Mon 1/31</b>	<b>Exam 1</b>	
5	Wed 2/2, Fri 2/4	Probability Trees, Bayes Formula, Counting Rules	Ch 5.6-5.8
6	Week of 2/7	Discrete RVs - General, Uniform, Bernoulli, Binomial	Ch 6.1-6.4
7	Week of 2/14	Discrete RVs - Poisson, Hypergeometric, Geometric, Transformations	Ch 6.5-6.8
<b>8</b>	<b>Week of 2/21</b>	<b>NO CLASS - WINTER BREAK</b>	
9	Week of 2/28	Continuous RVs -Uniform, Normal	Ch 7.1-7.4
10	Week of 3/7	Random Normal Variates and Approximations	Ch 7.3-7.5
<b>11</b>	<b>Mon 3/14</b>	<b>Exam 2</b>	
11	Wed 3/16, Fri 3/18	Exponential, Triangular Distribution	Ch 7.6-7.7
12	Week of 3/21	Estimators, Sampling Distributions, CLT	Ch 8.1-8.3
13	Week of 3/28	Confidence Intervals for Means and Proportions	Ch 8.4-8.8
14	Mon 4/4	Catch up and Review	
<b>14</b>	<b>Wed 4/6</b>	<b>Exam 3</b>	
14	Fri 4/8	One sample hypothesis testing	Ch 9.1-9.3
15	Week of 4/11	One sample hypothesis testing	Ch 9.4-9.5
16	Mon 4/18	One sample hypothesis testing	
<b>17</b>	<b>Mon 4/25</b>	<b>Final Exam 12p-3p in our normal classroom</b>	

## QMM 240 Syllabus Supplement University General Education Requirement

This course covers descriptive statistics, probability, probability distributions, sampling distributions, estimation, and hypothesis tests. Emphasizes business applications and computer analysis of data. Its prerequisites are MTH 121 or MTH 141, and MIS 100 (or MIS 200 or CSE 125 or CSE 130) with a minimum grade of 2.0 in each course. MTH 121 is a knowledge foundation area in the General Education Program. QMM 240 satisfies the 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 problems across a range of applications, and knowledge of the personal, professional, ethical and societal implications of these applications. QMM 240 seeks to help the student:

- Understand the roles and limitations of statistics in addressing decision problems faced by individuals, firms, organizations, and public agencies, and the contexts in which such problems arise.
- Organize, summarize, compare, and analyze univariate data.
- Recognize and apply common probability distributions to situations that may arise in business contexts (e.g., binomial, Poisson, normal).
- Create and interpret confidence intervals for the mean and proportion, and estimate required sample sizes for desired levels of precision.
- Perform hypothesis tests for the mean and proportion, and recognize situations in which they would be appropriate.
- Understand Type I error, power, and the role of  $p$ -values in hypothesis tests.
- Use computers confidently and effectively in the previous tasks.

By applying the methods taught in the MTH 121 prerequisite course, QMM 240 builds on MTH 121 by using concepts such as linear equations, independent and dependent variables, algebraic functions, and graphs to evaluate and apply knowledge in a field outside of the student's major area of study. It also builds on prerequisite courses in information technology (MIS 100 or MIS 200 or CSE 125 or CSE 130) for basic concepts and terminology of computing and desktop application software (Excel, Word) to perform calculations and write reports on homework assignments involving business-oriented applications of statistics. By applying the principles taught in prerequisite courses, QMM 240 evaluates and applies knowledge in a field outside of the student's major area of study to address problems facing business managers and other administrators. QMM 240 applies knowledge in a field outside of the student's major area of study to calculate descriptive statistics, calculate probabilities from given probability functions, construct confidence intervals using appropriate formulas, calculate test statistics in hypothesis tests, and create graphs of functions. Applications include using the rules of algebra to calculate sums, test statistics, probabilities, combinations, permutations, and sample sizes. Concepts of functions (rules, tables, equations) are used to define random variables and interpret their domains and ranges. The concept of graphs of functions is applied to probability distributions. The concept of an exponential function is applied to the normal and Poisson probability density functions.

The cross-cutting capacity is *critical thinking*. Students learn to organize data and use it to improve decision-making in business or in not-for-profit organizations (e.g., government, health care). Because this course applies knowledge from prerequisite courses along with methods taught in this course to problems of managerial decision making, its content enhances students' critical thinking skills. Students also learn to avoid common pitfalls in reasoning from data (e.g., generalization from non-random samples, misinterpretation of confidence intervals, incorrect interpretation of  $p$ -values in hypothesis tests). Writing is not a major component of this course. However, instructors may assign written homework exercises and/or computer projects to individuals or teams. Because of the class size, such written assignments are limited in scope and frequency.

*Revised February 8, 2007*