OM 210: Statistical Analysis for Management

Summer 2011, Session C

Section C01 (CRN 40330)

Dr. Harvey Singer

Course Syllabus

Office
Enterprise Hall (ENT), Room 144.

Office Hours
Monday through Thursday from 12:30 to 1:30 PM, or by appointment.

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Website
at https://gmu.blackboard.com/

Description
Covers the essential statistics and probability methods and their application to support quantitative decision analysis for resolving business problems. Includes descriptive statistics, probability distributions, sampling, estimation, hypothesis testing, and linear regression (both simple and multiple). Daily class meetings; attendance is obligatory. See the “Topics” section for the list of subjects.

Class Sessions
MTWR from 2:00 to 4:45 PM in University Hall, room 1201 (UH 1201), from Tuesday, July 5, to Friday, August 5, 2011.

Prerequisites and Corequisites
1. Prerequisite: MATH 108 or 113, with a grade of C or better or the equivalent as approved by the SOM Office of Academic and Career Services (OACS). Prerequisites are solely and strictly enforced by the OACS. Students not meeting the MATH 108 prerequisite will be dropped by OACS without input from me.
2. Corequisite: MIS 102 with a grade of C or better. As a corequisite, MIS 102 may be taken concurrently with OM 210. (In fact, for practical reasons, MIS 102 may be taken out of sequence and may even be taken after OM 210.)
3. Additionally, proficiency in elementary algebra is essential and is expected. Deficiencies in elementary algebra should be self-remediated. Also, the student should be familiar with recent versions of MS Office products, especially MS Word, PowerPoint, and Excel.
Registration
1. The course instructor has no authority to resolve any issues concerning student registration. All matters relating to course registration are the exclusive domain of the Office of Academic and Career Services (OACS), and are handled solely by them. OACS is located on the lower level of Enterprise Hall in room 008. OACS can be reached by phone at 703-993-1880 or send e-mail to somserv@gmu.edu.
2. There are no force-adds or schedule adjustments in SOM.
3. Students must be officially registered for the course to receive a grade. Students are solely responsible to verify their own registration status.

Required Textbook
   ➢ The 5th Edition supersedes and replaces all other editions.
   ➢ Specifically, all previous editions and the international edition are unacceptable, as they are different. Any edition of the textbook other than that listed above will not be supported. Students using other editions do so solely at their own risk.
2. The text is supplemental reading and is not a substitute or replacement for classroom instruction.

Calculator
You should have a “scientific” type calculator which can calculate square roots (√), powers (x^y), and exponentials (e^x). (The factorial function is optional).

Undergraduate Program Learning Goals (Goals addressed in this course are in bold)
1. Our students will be competent in their discipline.
2. Our students will be aware of the uses of technology in business.
3. Our students will be effective communicators.
4. Our students will have an interdisciplinary perspective.
5. Our students will be knowledgeable about global business and trade.
6. Our students will recognize the importance of ethical decisions.
7. Our students will be knowledgeable about the legal environment of business.
8. Our students will be knowledgeable about team dynamics and the characteristics of effective teams.
9. Our students will understand the value of diversity and the importance of managing diversity in the context of business.
10. Our students will be critical thinkers.

Specific Course Objectives
1. To master the essential concepts and tools of statistics and probability, and to apply these methodologies to solve practical, real-world, problems emphasizing business applications.
2. To provide a sound basis in statistics and probability for the student’s future academic and professional careers.
3. To demonstrate the use of statistics, probability, and statistical models to support decision making in business.
4. To develop the critical thinking and independent problem solving skills necessary to independently analyze business data and model business situations.

Approach
1. Geared for the future business professional engaged in decision making or decision support. The emphasis is on business applications, and not mathematics. The format will be mostly lectures, stressing learning by doing through solution of practical problems; discussions and questions are highly encouraged.
2. I am responsible for teaching the best course possible, including providing the best possible resources which promote learning. Students are individually and solely responsible for their own learning, including the application of the information presented, as demonstrated by performance on the graded homework, quizzes, and exams. I have office hours scheduled to meet with students individually to work with them on a one-to-one basis to help their understanding and mastery of the material.

Disability
All academic accommodations due to disability must be arranged by the student with the Office of Disability Services (ODS); contact ODS at 703-993-2474. I will cooperate with ODS to the greatest extent possible to accommodate a student’s special needs.

Honor Code
1. Students are obligated to strict adherence to the University honor system and code as stated in the 2010-11 University Catalog. You are bound by the code to neither receive nor furnish any assistance of any kind on any graded assignment, test, or quiz.
2. Specifically:
   - All work submitted for a grade, including tests, quizzes, and homeworks, are to be completed individually, on your own, and alone.
   - Communication and collaboration, or suspicion thereof, of any kind between students during tests and quizzes is strictly and absolutely forbidden.
   - Any evidence or suspicion of collaboration on graded homework will be construed as an honor code violation.
3. Any violations of the honor code will result in an immediate, automatic, and severe devaluation of the score on that test, quiz, or homework to a failing grade and the filing of formal charges to the university Honor Committee.

Connectivity
1. It is the student’s responsibility to have reliable and adequate Internet connectivity and access (including GMU computers available on campus).
2. For technical assistance, visit the ITU Support Center at http://itusupport.gmu.edu/ or call 703-993-8870 or send e-mail to support@gmu.edu. However, it is solely the student’s responsibility to determine and resolve any connectivity and other problems.

E-mail Contact
1. I communicate remotely with students only by GMU e-mail. I will not reply to voice mail messages left on my GMU office telephone.
2. For security and confidentiality, I will only reply to GMU e-mail addresses.
3. I will only reply to student e-mail that is signed with your full name and that states your course and section. E-mails without this information will not receive a reply.
4. I check and respond to e-mail during my posted office hours. I do not check or respond to e-mail at night after business hours or on the weekends.
5. Expect a reply to an inquiry within 1 to 2 days after I read your e-mail.

Class Etiquette
Be courteous to and respectful of others in class. Please refer to the document “Lecture Etiquette” posted under the link “Getting Started.”

Class Participation
1. Performance is highly associated with class attendance and participation.
2. Students are expected to attend all classes.
3. Class participation consists of active engagement in the presentation of material through note-taking, questions, and discussion.
4. The student is solely responsible for all assignments and material presented in class even if missed due to absence.

Course Website on Blackboard CE
1. Login to https://courses.gmu.edu and click on the link for your OM 210 C01 section. (Note: This is a new website specific to this semester and section and is currently under construction.)
2. My OM 210 course website consists of separate pages and links containing this syllabus, announcements and assignments, PowerPoint presentations, supplemental notes, solutions to some textbook and homework problems, sample tests, and student grades. There is an intuitive architecture to the organization of the course website; the student should become familiar with navigating through it.
3. The Blackboard course calendar will be maintained to provide a current and up-to-date of the schedule of coverage, tests, quizzes, and deliverables.
4. The website is continually being maintained. During the semester, new documents may be created and existing documents may be modified as appropriate. Important course announcements will be posted under the link “Announcements” from the course home page and/or on the course calendar. You should check the website often, at least twice a week.
5. Downloadable lecture presentations are posted on the Blackboard CE course website. These are condensed and abridged versions (with shortened coverage and content) of the corresponding presentations delivered in class. (This is to alleviate the burden of taking notes in class and to allow you to give your full attention to the discussion.) I continually edit, revise, and expand my slides; I do not re-post the new versions. You should be prepared to augment the downloaded versions with your own notes during class.
6. Students will be informed beforehand of the pertinent documents to be presented in the next class.
7. It is strongly recommended that students download the pertinent course documents before class (e.g., lecture presentations) and well before assignment due dates and test (sample problems and tests).
8. The course website is an electronic medium to facilitate the transfer and dissemination of the course content. It is provided solely to augment classroom presentation of the material. The web site is not a substitute or replacement for attending class. On-line is not on vacation!

**Grading Metrics**
1. The final course letter grade is assigned rationally and objectively on the sole basis of a student’s performance in the class, as measured solely by the total point score earned by the student on all grading metrics. (See “Course Grade” below.)
   - There is no “extra credit” of any kind, for any reason.
   - Final total point scores are NOT “bumped” or rounded up to the next higher letter grade.
2. The maximum possible score for the course is 1240 points. A numerical final course total score is calculated as the sum of scores earned on:
   - all four (4) tests (1000 points max),
   - all five (5) technical quizzes (200 points max),
   - all four (4) submitted and graded problem sets/case studies (40 points max).
3. Each of the aforementioned grading instruments is described in the paragraphs below.

**Homework**
1. Mastery of the subject matter is measured by skill and proficiency in problem solving, which is gained by practice. The assigned homework should be regarded as the minimum amount of practice. (Homework is for the student’s benefit; it keeps the student current and it is a diagnostic tool by which the student may assess understanding and performance.)
2. Problems for each topic will be assigned from the corresponding chapter in the textbook.
3. Homework assignments will be posted under the link “Homework Assignments” from the course home page of my Blackboard CE OM 210 course website.
4. Four (4) sets of problems selected from the textbook will be assigned as homework and will be collected and graded, as announced.
5. Up to ten (10) points will be assigned to each collected homework assignment submitted on time. The graded homeworks contribute up to 40 points to the final course score.
6. Submissions of the assigned homework must be handwritten. Printed copies, photocopies, or electronic submissions will not be accepted.
7. Late homework will not be accepted under any circumstances. Missing homework will be assigned a score of zero, which will be counted in the total final course score. (There are no exceptions, regardless of reason, including [but not limited to] medical, family, work, and transportation emergencies.)
8. The submitted homework is an individual effort. Absolutely NO collaboration of any kind is permitted. Any collaboration will be treated as an Honor Code violation.
9. Homework assignments, including their solution and submission, are the sole responsibility of the student.
10. Solutions to some of the problems to some of the homework assignments may be posted under the link “Homework Assignments” after the assignment is due to be submitted.

**Tests**
1. Four (4) mandatory, non-cumulative, tests will be given, as announced. The tests will be comprehensive of the topics they cover.
2. Each individual test contributes the points scored to the final course score.
3. Specific topic coverage of all the tests will always be announced in advance of test dates. The tentative coverage is:
   - Test 1: Descriptive Statistics and Exploratory Data Analysis (200 points).
   - Test 2: Probability I (Basic Probability, Discrete Random Variables, and Discrete Probability Distributions) (200 points).
   - Test 3: Probability II (Normal and Sampling Distributions) (200 points).
   - Test 4: Inferential Statistics (sampling distributions, estimation, and hypothesis testing) and Regression and Correlation (both simple and multiple) (400 points).

Note that Test 4, the final, is worth double the point score of the previous tests. Altogether, the tests count for up to 1000 points of the final course score.

4. The schedule of tests is to be announced. Advance notice of the date and specific coverage of each test will be given in class and posted on my Blackboard CE OM 210 course website. As a general guidance, after the first week of classes, plan on one test per week for the session.

5. Tests are based upon and are comprehensive of the class presentation and discussion of the material covered as it was covered.

6. Each test will consist of multiple word problems; each problem will itself contain several or many parts.

7. All tests are strictly an individual effort. Absolutely NO collaboration or communication between students of any kind is permitted. (See the “Honor Code” paragraph above.)

8. All exams will be given in class and will be closed book. Use of the textbook, class notes, etc. is strictly prohibited unless otherwise stated by me. Use of a one-page study guide may be authorized by the instructor prior to the exam.

9. MISSED TESTS.
   - A missed test will be assigned a score of zero.
   - A missed test may be made up only under extreme circumstances, WITH supporting documentation, AND at the sole discretion of the instructor. Note that one only one (1) make-up (either test or quiz) is allowed. (See the “Make-ups” paragraph below).

Quizzes
1. Five (5) mandatory, non-cumulative quizzes will be given in class, as announced.
2. Each quiz will test your technical competency and mastery of specific techniques or methods that have been presented. It will be comprehensive of the topic it covers. Specific topic coverage of each quiz will always be announced in advance.
3. Each individual recitation quiz contributes the points scored (out of 40 points) to the final course score. Altogether, the quizzes count for up to 200 points of the final course score.
4. Each quiz will consist of a single word problem; which may contain several or many parts.
5. Items 4 through 9 inclusive for “Tests” apply to all technical quizzes.

Make-ups
1. One and only one (1) make-up is allowed (either a test or a recitation quiz). Note that lecture quizzes and Test 3 cannot be made-up.
2. Taking a make-up is not automatic. You must qualify and register for any make-up with the lecture instructor (ONLY) prior to registration deadline. (You must provide a valid and bona fide reason for missing the test or recitation quiz when it was originally scheduled, supported and verified by documentation. All decisions are final; there is no appeal.)
3. Re-testing to replace scores already earned on recitation quizzes and/or tests is strictly
   prohibited and will not be allowed under any circumstances.
4. A document stating the make-up policies and procedures will be posted on the OM 210
   course website under “Announcements.”
5. Make-ups may be of a different format and level of difficulty than the original test/recitation
   quiz. Also, no study guides will be allowed for any make-up.
6. A missed test or recitation quiz will be assigned a score of zero until it is made-up. After the
   make-up, the grade on the make-up will replace the zero and will be added into the final total
   course score.
7. The test/quiz make-up day is Friday, July 29, 2011, ONLY; test room and time is TBA.

Course Grade
1. The final course letter grade is assigned rationally and objectively on the sole basis of a
   student’s performance in the class as measured by the total point score earned by the student
   on all grading metrics in strict accordance with the schema stated below.
   ➢ Outside influences and obligations will not be factored into the course grade.
2. Students must be officially registered in this course to receive grades.
3. Final course grades are assigned as whole letters, WITH plus and minus.
4. Final course grades are assigned on a point system with a maximum of 1240 points for the
   course, based on the final total point score for the course, which is the sum of the scores
   earned on all tests, quizzes, and graded homework assignments.
5. Final total point scores are NOT “bumped” or rounded up to the next higher letter grade. For
   example, a final total point score of 892 will be assigned a course grade of C- and not C.
   (Note that a grade of C- is unsatisfactory in SOM; a grade of C or better is required in OM
   210 for application to SOM.)
6. There is no “extra credit” of any kind, for any reason.
7. Final course letter grade assignments on the 1240 point system are given in the table below.

<table>
<thead>
<tr>
<th>COURSE TOTAL SCORE *</th>
<th>COURSE GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FROM 1215 UP TO 1240</td>
<td>A+</td>
</tr>
<tr>
<td>1153</td>
<td>A</td>
</tr>
<tr>
<td>1116</td>
<td>A-</td>
</tr>
<tr>
<td>1091</td>
<td>B+</td>
</tr>
<tr>
<td>1029</td>
<td>B</td>
</tr>
<tr>
<td>992</td>
<td>B-</td>
</tr>
<tr>
<td>967</td>
<td>C+</td>
</tr>
<tr>
<td>893</td>
<td>C</td>
</tr>
<tr>
<td>868</td>
<td>C-</td>
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<tr>
<td>744</td>
<td>D</td>
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<tr>
<td>0</td>
<td>F</td>
</tr>
</tbody>
</table>

* Point ranges are inclusive.

8. The above chart will be adhered to strictly and without deviation or compromise.
Schedule
1. Refer to the Summer 2011 Schedule of Classes for the Academic Calendar (or go online to http://summer.gmu.edu/dates.html).
2. The schedules for all “deliverables” will be announced during the semester. Advance notice of the dates and specific coverage will be announced in class and posted on my OM 210 Blackboard course website.
3. The test/quiz make-up period is Friday, July 29. Time and location are TBA.
4. The last regular class is on Wednesday, August 3.
5. In conformity with the Final Exam Schedule promulgated on the Summer 2011 Session website (http://summer.gmu.edu/finalexams/), Test 4, the final exam, is scheduled for Friday, August 5, from 2:00 to 4:45 PM.
6. Scheduling conflicts with the final exam (Test 4) schedule can only be resolved through OACS (and not me) at least one week prior to the date of the final, with the appropriate paperwork. Requests not meeting any part of this condition will be automatically denied.

Topics
1. The tentative list of topics is given below, which follows the basic order of topics in the required text.
2. The list of topics is subject to change during the semester. Some sections in the text will be skipped and some material not contained in the text may be presented, as announced.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I. Describing Technical Data and its Variability (Descriptive Statistics)</strong></td>
<td></td>
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<tr>
<td>1. Data types and sources</td>
<td>1</td>
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<tr>
<td>2. Data presentation: Tabular and graphical methods</td>
<td>2</td>
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<tr>
<td>3. Data summarization: Numerical summary statistics</td>
<td>3</td>
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<tr>
<td><strong>Part II. Dealing With Uncertainty (Probability)</strong></td>
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<tr>
<td>4. Basic probability</td>
<td>4</td>
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<tr>
<td>5. Random variables and discrete probability distributions</td>
<td>5</td>
</tr>
<tr>
<td>General random variable and probability distribution concepts</td>
<td></td>
</tr>
<tr>
<td>Uniform, binomial, and Poisson probability distributions</td>
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<tr>
<td>6. Normal probability distribution</td>
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<tr>
<td><strong>Part III. Inferring from Data with its Variability (Inferential Statistics)</strong></td>
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<td>7. Sampling and sampling distributions</td>
<td>7</td>
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<tr>
<td>Sampling distribution of sample means</td>
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<tr>
<td>8. Estimation theory</td>
<td>8</td>
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<td>Point estimation</td>
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<td>Confidence interval estimation for means: $\sigma$ known and $\sigma$ unknown</td>
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<td>Sample size estimation</td>
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<td>9. Basic hypothesis testing: One Sample</td>
<td>9</td>
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<tr>
<td>Error types</td>
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<td>Significance tests for means: $\sigma$ known and $\sigma$ unknown</td>
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<tr>
<td>Testing with p-values</td>
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<tr>
<td>10. More hypothesis tests: Two Samples</td>
<td>10</td>
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<tr>
<td>Comparison of two population means: $\sigma$ known and $\sigma$ unknown</td>
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<tr>
<td>Analysis of variance (ANOVA)</td>
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<tr>
<td>Test of independence</td>
<td>11</td>
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<tr>
<td><strong>Part IV. Modeling Relationships Contained in Data (Regression)</strong></td>
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<tr>
<td>11. Simple linear regression and correlation</td>
<td>12</td>
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<tr>
<td>Calculating a regression line by the method of least squares</td>
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<tr>
<td>Correlation, the correlation coefficient, the coefficient of determination</td>
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<tr>
<td>Using the estimated regression equation: estimation and prediction</td>
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<td>12. Multiple linear regression</td>
<td>13</td>
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<tr>
<td>The multiple regression model</td>
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<tr>
<td>Computer calculation and understanding the computer output report</td>
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<tr>
<td>Model building</td>
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<tr>
<td>Using the estimated regression equation: estimation and prediction</td>
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</tbody>
</table>