OM 210: Statistical Analysis for Management

FALL 2013 Course Syllabus

Lecture Section 001
(Tuesday, CRN 72009)

Dr. Harvey Singer

Office
Enterprise Hall (ENT), Room 144.

Office Hours
Tuesday through Thursday from 1:00 to 3:00 PM; or by appointment.
(Schedule subject to change)

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Description
Introduces the application of statistical methods to support quantitative decision analysis for resolving business problems. Topics include descriptive statistics, probability and probability distributions, sampling and sampling distributions, estimation, hypothesis testing, and linear regression (both simple and multiple). Lecture, recitation format with weekly lecture and weekly recitation; attendance in both lecture and recitation is mandatory and obligatory. See the “Topics” section for the list of subjects.

Lecture Session: Tuesday from 7:20 to 9:30 PM in Innovation Hall room 103 (IN 103).

Recitations: Students MUST also register for a recitation (any one of OM 210 301 to 309).

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 this prerequisite will be dropped by OACS without input from the faculty instructor.

2. Corequisite: MIS 102 with a grade of C or better. As a corequisite, MIS 102 may be taken concurrently with OM 210; MIS 102 may be taken out of sequence and may even be taken after OM 210. Students who have not taken MIS 102 or are not currently taking MIS 102 will not be dropped from OM 210.
3. Essential and expected knowledge: Proficiency in elementary algebra and geometry. Familiarity with recent versions of MS Word, PowerPoint, and Excel. Deficiencies should be self-remediated.

**Registration**
1. The course instructor or graduate teaching assistants (GTAs) have 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**
   - Available from the Mason bookstore in a three-hole punch version titled *Business Statistics: Statistics Analysis for Management*. (This is an exact reproduction of the hardcover version.)
   - The 6th 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.

**iclicker remote**
1. Class participation is encouraged and will be assessed in part by student use of an iclicker remote, which is a response system that allows students to answer questions posed during lecture. iclicker remotes can be purchased at the GMU Bookstore.
2. Students should bring their iclicker remote to all lectures, as it will greatly enhance the value of those classes by enabling more active participation and learning. Also, grades will be influenced by whether or not students answer questions.
3. Students must register their iclicker remotes at [http://www.iclicker.com/registration](http://www.iclicker.com/registration) so that the system, which can recognize each remote that provides an answer, can tie students to their remotes. Note that students are solely responsible to register their iclicker remotes themselves at the aforementioned website.
4. Using an iclicker remote on behalf of someone or having someone use an iclicker remote on your behalf is an Honor Code violation (see below).

**Calculator**
You should have a “scientific” type calculator which can calculate square roots (√), powers (x^), and exponentials (e^). (The factorial function is optional).
Laptop Use
1. The use of laptops during lecture and recitation for activities directly related to the ongoing 
class is allowed and encouraged.
2. Laptops can be distracting to your neighbors, especially for unrelated activities which 
include, but are not limited to, surfing the Internet, checking email, playing games, and doing 
homework for this or another class. Such use will result in the loss of the privilege to use a 
laptop in class.

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. Lectures are the formal 
presentation and teaching of the material and basic problem solving skills; discussions and 
questions are highly encouraged. Recitations are the practical side of the course, stressing 
learning by doing through solution of practical problems.
2. The lecture and recitation instructors are 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 evidenced by their participation and as demonstrated by their 
performance on the graded homework, quizzes, and exams. The instructor and GTAs both 
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
The lecture faculty instructor and the recitation GTA will cooperate with ODS to the greatest extent possible to accommodate a student’s special needs. 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. Prior approval for any and all arrangements must be obtained from the lecture faculty instructor (and not the recitation GTA).

Honor Code
1. Students are obligated to strict adherence to the University honor system and code as stated in the 2013-2014 University Catalog (online at http://catalog.gmu.edu). Honor code expectations are stated explicitly in the School of Management Honor Code Pledge posted on the Blackboard OM 210 course website. Your enrollment in this course is taken to be your implied affirmation of this pledge.
2. You are bound by the Honor Code to neither receive nor furnish any assistance of any kind on any graded assignment, test, or quiz. Specifically:
   • All work submitted for a grade, including tests, quizzes, and homework assignments, is to be completed individually, on your own, and alone.
   • Copying quiz or test answers from another student and/or allowing your answers to be copied by another student is strictly and absolutely forbidden.
   • Communication and/or collaboration, or suspicion thereof, of any kind between students during tests and quizzes is strictly and absolutely forbidden.
   • Using an impermissible aid on any quiz or test such as unauthorized notes or electronic devices with communication and Internet connectivity is strictly and absolutely forbidden.
   • Any evidence or suspicion of collaboration on graded homework will be construed as an honor code violation.
   • Using an iclicker remote on behalf of someone or having someone use an iclicker remote on your behalf is strictly and absolutely forbidden.
   • Removing an exam from the classroom and sharing information about exams with other students is strictly and absolutely forbidden.
3. Honor code violations will not be tolerated. Any violations of the honor code will result in an immediate filing of formal charges with the University Honor Committee which will be aggressively pursued with great vigor.
4. Registration in this course is taken as your implied compliance with the honor code policy in general and the specific terms cited in item 2 above.

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. E-mail from yahoo or gmail or any other non-Mason account will be deleted without reply.
3. I will only reply to student e-mail that is signed with your full name and that states your course and section. E-mail without this information will be deleted without 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. You should 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 lecture and recitation. Please refer to the document “Classroom Etiquette” posted under the link “Getting Started.”

Class Participation
1. Performance is highly associated with attendance and participation in all classes (both lecture and recitation).
2. Students are expected to attend all classes. The student is solely responsible for all assignments and for all material presented in class (even if missed due to absence).
3. Class participation consists of active engagement in the presentation of material through note-taking, questions, and discussion. Class participation, which requires attendance, contributes materially and measurably to a student’s final course grade.
4. For lecture, participation is quantitatively assessed by a student’s earned score on “lecture quizzes” which are described in the section below.

Course Website on Blackboard
1. Login to https://mymasonportal.gmu.edu and click on the link for OM 210 001. (Note: This is a new website specific to this semester and section and is currently under construction.)
2. My Blackboard 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. You should navigate the folders on the “Course Content” page often, perhaps several times a week. The website is continually being maintained. Course documents are continually created, edited, revised, expanded, and posted. The student is solely responsible for staying current with the course.
4. As a convenience to the student to alleviate the burden of taking notes in class and to give their full attention to the discussion, downloadable versions of the lecture presentations are posted on my Blackboard OM 210 course website. These slide sets are located on the “Course Content” page in the “Topical Course Coverage” folder, which is itself organized by topic (and corresponding textbook chapter). These are condensed and abridged versions (with shortened coverage and content) of the corresponding presentations delivered in lecture.
   • It is strongly recommended that before class students download the pertinent slide sets to be presented. Also, students should have pen in hand to augment the downloaded versions with their own notes during class.
   • These pages may also contain solutions to some of the problems worked in class.
5. The coverage planned for the next lecture and recitation will be announced in class and posted in the “Next Class” folder on the Course Content page. Students will be informed beforehand of the pertinent documents to be presented in the next class.

6. Important course announcements, including dates and descriptions of tests and quizzes, will be posted in the “Announcements” folder on the Course Content page. The student is solely responsible for the information contained these announcements.

7. Homework assignments and their due dates are specified in documents located in the “Homework Assignments” folder on the Course Content page. The student is solely responsible for submitting all course deliverables on their due date.

8. It is strongly recommended that students download the pertinent course documents well before assignment due dates and tests (e.g., sample problems and sample tests).

9. All course related documents posted to the OM 210 course website constitute permanent attachments to this syllabus once they are promulgated in this fashion.

10. The course website is an electronic medium to facilitate the transfer and dissemination of the course content. Specifically, it is provided as a repository of course content and information so as to augment classroom presentations. The website is not a substitute or replacement for attending class. On-line is not on vacation!

Grading Metrics
1. The course is scored and graded on a point system; the value of the course is 1255 points.
2. A numerical final course total score is calculated as the sum of scores earned on all tests, quizzes, homework assignments (out of a maximum possible score of 1255 points).
3. The metrics used for determining the final course grade are the scores earned on:
   - all three (3) tests (850 points max),
   - all six (6) recitation quizzes (240 points max),
   - all nine (9) lecture quizzes (55 points max),
   - all ten (10) submitted and graded problem sets/case studies (110 points max).
4. Each of the aforementioned grading instruments is described in the paragraphs below.
5. The final course letter grade is assigned objectively, strictly, and solely according to the numerical final course total score. (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. Grades are not raised because a total score is close to the cutoff between two grades.
6. Students are solely responsible for tracking their grades on Blackboard to ensure that the information entered is accurate.

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. Documents containing the homework assignments will be posted in the folder “Homework Assignments” on the Course Content page of the Blackboard OM 210 course website. These documents constitute permanent attachments to this syllabus once they are promulgated in this fashion.
3. Each homework assignment for a topic will consist of problems selected from the corresponding chapter or chapters of the textbook.
4. Ten (10) sets of problems selected from the textbook will be assigned as homework and will be collected and graded, as announced.
5. Up to eleven (11) points will be assigned to each collected homework assignment submitted on time. The graded homeworks contribute up to 110 points of the final course score.
6. Submissions of the assigned homework must be handwritten with the students name and section. 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; zero homework scores will be counted in the total final course score. (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. Three (3) mandatory, non-cumulative, tests will be given, as announced. The tests will be comprehensive of the topics they cover.
2. Specific topic coverage and valuation of the tests are as follows:
   - Test 1: Descriptive Statistics and Exploratory Data Analysis; 200 points
   - Test 2: Basic Probability, Random Variables, and Probability Distributions; 200 points.
   - Test 3: Inferential Statistics (sampling distributions, estimation, and hypothesis testing) and Regression and Correlation (both simple and multiple); 450 points.
   Altogether, the tests count for up to 850 points of the final course score. Each individual test contributes the points scored to the final course score.
3. Tests will always be announced well in advance of their dates. Advance notice of the date and specific coverage of each test will be announced in both lecture and recitation.
   a. Tests 1 and 2 will be given in the recitation on their announced dates. Test 3, the final, is scheduled for Tuesday, December 10, 2013, from 7:30 to 10:15 PM, in Innovation Hall room 103 (IN 103) (see item 5 of “Schedule”).
   b. A written document announcing each test will always be posted on my OM 210 course website well in advance of the test. This document will describe the test by specifying its coverage, format, honor code, conditions, and other pertinent information. Once promulgated in this fashion, each and every document becomes a permanent attachment to this syllabus.
   c. The student is solely responsible for reading and understanding the test announcement document. This document should be used as a guide in studying and preparing for each test.
4. Each test will consist of multiple word problems; each problem may itself contain several or many parts.
5. Tests are based upon the class presentation and discussion of the material covered in lecture. Moreover, the tests will be comprehensive of the material as covered in lecture and recitation.

6. 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.)

7. All tests are “closed book.” Use of the textbook, class notes, etc., is strictly prohibited. Use of a one-page, self-written, study guide may be authorized prior to the test.

8. 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 lecture instructor. Note that one only one (1) make-up (either test or recitation quiz) is allowed. (See the “Make-ups” paragraph below).

Recitation Quizzes
1. Six (6) mandatory, non-cumulative, quizzes will be given in the recitation, as announced.
2. Quizzes will always be announced well in advance of their dates. Advance notice of the date and specific coverage of each quiz will be announced in both lecture and recitation.
   a. A written document announcing each quiz will always be posted on my OM 210 course website well in advance of the test. This document will describe the quiz by specifying its coverage, format, honor code, conditions, and other pertinent information. Once promulgated in this fashion, each and every document becomes a permanent attachment to this syllabus.
   b. The student is solely responsible for reading and understanding the quiz announcement document. This document should be used as a guide in studying and preparing for each quiz.
   c. As a general guidance, quizzes will alternate with tests and homework.
3. Each quiz will be comprehensive of the topic it covers. Specific topic coverage of each quiz will always be announced well in advance as stated in item 2a above.
4. Each individual recitation quiz contributes the points scored (out of 40 points) to the final course score. Altogether, the quizzes count for up to 240 points of the final course score.
5. Each quiz will consist of a single word problem; which may contain several or many parts.
6. Items 5 through 8 inclusive for “Tests” apply to all recitation quizzes.

Lecture Quizzes
1. Nine (9) mandatory quizzes will be given in the lecture (at anytime during the lecture). Altogether, the lecture quizzes count for up to 55 points of the final course score.
2. All lecture quizzes are individual efforts. Under the Honor Code, absolutely NO collaboration or communication between students of any kind is permitted.
3. The first and the last lecture quizzes are by Scantron form (form 882-E). These two quizzes are for self-evaluation purposes only to assess your state of knowledge of statistics and probability prior to and then after formal instruction in this course. Incomplete Scantron forms will not be scored. Each Scantron quiz is worth up to 10 points for a total of 20 points for both.
4. The other seven lecture quizzes will all use the iclicker remote. These lecture quizzes will consist of several short problems or questions that are based on the coverage in the previous or current lecture.
   a. Each iclicker quiz is worth up to 5 points for a total of 35 points for all seven.
   b. Students who answer all iclicker questions that are asked during a lecture will receive 10 points for that lecture. Students who answer no questions that are asked on a day will receive 0 points for that day. Students who answer one or more, but not all, of the questions asked on a day receive credit equal to 5 points minus 1.5 points for each unanswered question for that day, with a minimum score of 0.
   c. Students will receive full credit for their good-faith attempt at answering questions, regardless of whether their answer is correct or not. However, if students do not appear to be putting adequate effort into correctly answering questions or if an insufficient number of students are getting correct answers, then the scoring these lecture quizzes may be modified to give more credit for correct answers.
   d. Students will not receive credit for participation until their iclicker is correctly registered. Once scores are downloaded for a given class, the instructor will not go back and give credit for students who voted, but who had not registered their remotes by the time scores were downloaded.
   e. One or more questions may be asked at the start of class, so being on time and ready at the start of class is important. One or more questions may be asked towards the end of class, so stay until lecture is dismissed.
   f. Using an iclicker remote on behalf of someone or having someone use an iclicker remote on your behalf is an Honor Code violation. Students may be asked to present ID.

5. MISSED LECTURE QUIZZES:
   a. A missed Scantron quiz cannot be made up under any circumstances; it will be assigned a score of zero. (No exceptions, regardless of the reason, including [but not limited to] medical, family, work, and transportation emergencies.)
   b. One and only one iclicker quiz will be excused with the full credit of 5 points; all other missed iclicker quizzes will be assigned a score of zero.

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 will 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 tentatively set for Thursday, December 5, 2013 (date subject to change); 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 course as measured by the total point score earned by the student on all grading metrics in strict accordance with table listed in item 7 below.
   ➢ Outside influences and obligations will not be factored into the course grade.
2. Midterm course grades will be assigned as whole letters, WITHOUT plus and minus, based on the total of all scores received up to the time of their assignment.
3. Final course grades will be assigned as whole letters, WITH plus and minus.
4. Final course grades are assigned on a point system with a maximum of 1255 points for the course; see the table below. The final total point score for the course is the sum of the scores earned on all tests, recitation quizzes, lecture quizzes, and graded homework assignments.
5. Final total point scores are **NOT** “bumped” or rounded up to the next higher letter grade. Specifically, a final total point score of 903 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 acceptance into SOM.)
6. There is no “extra credit” of any kind, for any reason.
7. Final course letter grade assignments on the 1255 point system are given in the table below.

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<tr>
<th>COURSE TOTAL SCORE *</th>
<th>COURSE GRADE</th>
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<td>FROM</td>
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* Point ranges are inclusive.

8. The above chart will be adhered to strictly and without deviation or compromise.

Incompletes
An incomplete will only be given to a student who has completed a majority of the work for the semester, has a course grade of C or better in the work completed at the time of the request, and has a documented excusable reason such as a serious illness or unanticipated family emergency for being unable to complete the remainder of the work as scheduled. Poor time management or failure to deal with a situation earlier in the semester will not be accepted as reasons for an incomplete.
Schedule
1. The Fall 2013 Semester Calendar is at [http://registrar.gmu.edu/calendars/2013Fall.html](http://registrar.gmu.edu/calendars/2013Fall.html).
2. The schedules for all “deliverables” will be announced well in advance of their due dates during the semester and posted on my Blackboard OM 210 course website.
3. The last lecture is Tuesday, December 3, 2013; recitations will be held that week on Thursday, December 5, and Friday, December 6 (these are the last recitations of the semester).
4. The test/recitation quiz make-up day is tentatively set for Thursday, December 5, 2013. Time and location are TBA.
5. In conformity with the official Fall 2013 Final Exam Schedule promulgated by the Office of the University Registrar (at [http://registrar.gmu.edu/calendars/2013FallExam.html](http://registrar.gmu.edu/calendars/2013FallExam.html)) for “non-standard” courses, Test 3, the Final Exam, is scheduled to be given on Tuesday, December 10, 2013 from 7:30 to 10:15 PM, in Innovation Hall room 103 (IN 103).
6. Conflicts in the final exam (Test 3) schedule can only be resolved through the Office of Academic and Career Services (not the course professor [me] or the GTAs) 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.
### Topic

**Part I. Describing Technical Data and its Variability (Descriptive Statistics)**
1. Data types and sources
2. Data presentation: Tabular and graphical methods
3. Data summarization: Numerical summary statistics

**Part II. Dealing With Uncertainty (Probability)**
4. Basic probability
5. Random variables and discrete probability distributions
   - General random variable and probability distribution concepts
   - Uniform, binomial, and Poisson probability distributions
6. Normal probability distribution

**Part III. Inferring from Data with its Variability (Inferential Statistics)**
7. Sampling and sampling distributions
   - Sampling distribution of sample means
8. Estimation theory
   - Point estimation
   - Confidence interval estimation for means: $\sigma$ known and $\sigma$ unknown
   - Sample size estimation
9. Basic hypothesis testing: One Sample
   - Error types
   - Significance tests for means: $\sigma$ known and $\sigma$ unknown
   - Testing with $p$-values
10. More hypothesis tests: Two Samples
    - Comparison of two population means: $\sigma$ known and $\sigma$ unknown
    - Analysis of variance (ANOVA)
    - Test of independence

**Part IV. Modeling Relationships Contained in Data (Regression)**
11. Simple linear regression and correlation
    - Calculating a regression line by the method of least squares
    - Correlation, the correlation coefficient, the coefficient of determination
    - Using the estimated regression equation: estimation and prediction
12. Multiple linear regression
    - The multiple regression model
    - Computer calculation and reading a computer output report
    - Using the estimated regression equation: estimation and prediction