OM 210: Statistical Analysis for Management

Summer 2016, Session C

Section C02 (CRN 41605)

Dr. Harvey Singer

Course Syllabus

Office: Enterprise Hall (ENT), Room 143.
Office Hours: MTWR after class from 4:30 to 5:15 PM in Innovation Hall room 105 or by appointment.
Phone: (703) 993-1798
Fax: (703) 993-1809
E-mail: hsinger@gmu.edu
Website: at https://mymasonportal.gmu.edu/

Description
Covers the essential statistics and probability methods and their application 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). (See the “Topics” section for more information.) Class meets daily from Monday through Thursday; attendance is mandatory and obligatory.

Class Sessions
MTWR from 1:20 to 4:20 PM in Innovation Hall room 105 (IN 105), from Monday, June 27, to Friday, July 29, 2016.

Prerequisites
1. C or higher in MATH 108 or MATH 113 or HNRT 225. Prerequisite enforced by registration system and the OACS. Students not meeting the math prerequisite will be dropped by OACS without input from me.
3. Essential and expected knowledge: Proficiency in elementary algebra and geometry. Familiarity with recent versions of MS Word, PowerPoint, and Excel. Deficiencies in any of these areas should be self-remediated.

Registration

OM 210 C02 (41605)
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 by e-mail to somserv@gmu.edu.

2. There are no force-adds or schedule adjustments in School of Business.

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**

   - **It is not necessary to purchase the access code. Any data files required for textbook problems and case studies will be posted on the Blackboard course website.**
   - The 7th 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 ($\sqrt{}$), powers ($x^y$), and exponentials ($e^x$). (A 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, shopping, 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.
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 tools and 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
The faculty instructor will cooperate with Office of Disability Services (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 ODS; contact ODS at 703-993-2474. Prior approval for any and all arrangements must be obtained from the faculty instructor.

Honor Code
1. Students are obligated to adhere strictly to the University honor code as stated in the University Catalog and online at [http://oai.gmu.edu/the-mason-honor-code-2/](http://oai.gmu.edu/the-mason-honor-code-2/). Honor code expectations are stated explicitly in the School of Business 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, are 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 Internet connectivity is strictly and absolutely forbidden.
• Any evidence or suspicion of collaboration on graded homework will be construed as an honor code violation.
• 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. Your registration in this course is taken as your implied compliance with the honor code policy in general and the specific terms cited in this section.

**Connectivity**
1. It is the student’s responsibility solely 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/](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 non-GMU accounts, i.e., yahoo, gmail, etc., 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-mails 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 student 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 class. Refer to the document “Classroom Etiquette” posted on the Blackboard OM 210 course website under the link “Course Information.”

**Class Participation**
1. Performance is highly associated with attendance and participation in all classes.
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. Class participation is quantitatively assessed by the student’s “participation 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 C02. (Note: This is a new website specific to this section and is currently under construction.)
2. My Blackboard OM 210 C02 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. Course documents are continually created, edited, revised, expanded, and posted.
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. 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 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 class.
   - 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 class 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. 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 course is scored and graded on a point system; the value of the course is 1268 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 1268 points).
3. The metrics used for determining the final course grade are the scores earned on:
All four (4) exams (1000 points max).
- All five (5) technical quizzes (200 points max).
- All four (4) submitted and graded problem sets/case studies (40 points max).
- All six (6) participation quizzes (28 points max).

Each of the aforementioned grading instruments is described in the paragraphs below.

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.

Students are solely responsible for tracking their grades on Blackboard to make sure 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. Four (4) sets of problems selected from the textbook will be assigned as homework and will be collected and graded, as stated in the homework assignment document.

5. Up to ten (10) points will be assigned to each collected homework assignment submitted on time. Altogether, the graded homework assignments contribute up to 40 points to the final course score.

6. Submissions of the assigned homework must be handwritten with the students name. 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.

Exams
1. Four (4) mandatory, non-cumulative, exams, including the Final Exam, will be given, as announced. The exams will be comprehensive of the topics they cover.

2. Specific topic coverage, tentative dates, and valuation of the exams are as follows:
• Exam 1: Descriptive Statistics and Exploratory Data Analysis.
  ➢ In class on Monday, July 11, 2016.
    ▪ Dates subject to change.
  ➢ Maximum point value = 200 points.
  ➢ In class on Monday, July 18, 2016.
    ▪ Dates subject to change.
  ➢ Maximum point value = 200 points.
• Exam 3: Basic Inferential Statistics (sampling distributions and estimation).
  ➢ In class on Monday, July 25, 2016.
    ▪ Dates subject to change.
  ➢ Maximum point value = 200 points.
• Final Exam: Hypothesis Testing and Regression and Correlation (both simple and multiple).
  ➢ In class on Friday, July 29, 2016 from 1:30 to 4:15 PM.
    ▪ Date NOT subject to change except by order of the University Registrar.
    ▪ As per the Final Exam Schedule for “non-standard times.”
  ➢ Maximum point value = 400 points.

3. Altogether, the exams count for up to 1000 points of the final course score. Each individual exam contributes the points scored to the final total course score.

4. a. All exams are given in the assigned classroom.
   b. Exams 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 class and posted on my Blackboard OM 210 course website. As a general guidance, after the first week of classes, you should plan on one test per week for the session.
   c. A written document announcing each exam 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.
   d. The student is solely responsible for reading and understanding the exam announcement document. This document should be used as a guide in studying and preparing for each exam.

5. Each exam will consist of multiple word problems; each problem may itself contain several or many parts.

6. Exams are based upon the class presentation and discussion of the material covered in class. Moreover, the exams will be comprehensive of the material as covered in class.

7. All exams 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 are “closed book.” Use of the textbook, study notes, etc., is strictly prohibited.

9. Any scheduling issues with exam dates other than that of the Final Exam should be directed to the course instructor well before the exam.

10. Re-testing to replace scores already earned on exams is strictly prohibited and will not be allowed under any circumstances.

11. MISSED EXAMS
A missed exam will be assigned a score of zero.

A missed exam 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 exam or technical quiz) is allowed. (See the “Make-ups” paragraph below).

Technical Quizzes
1. Five (5) mandatory, non-cumulative, technical quizzes will be given in class, as announced.
2. The schedule of quizzes is to be announced. Quizzes will always be announced well in advance of their dates, both in class and on Blackboard.
   a. A written document announcing each quiz will always be posted on my Blackboard OM 210 course website well in advance of the quiz. 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, after the first week of classes, you should plan on one quiz per week for the session.
3. 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.
4. Each individual 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.
5. Each quiz will consist of a single word problem; which may contain several or many parts.
6. Items 4 through 11 inclusive for “Exams” apply to all technical quizzes.

Participation Quizzes
1. Six (6) mandatory quizzes will be given in the class (at any time during the class). Altogether, the participation quizzes count for up to 28 points of the final course score.
2. All participation 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 participation 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 8 points for a total of 16 points.
4. The remaining four (4) participation quizzes will consist of questions asked in class that are based on the coverage in the previous or current lecture. Each quiz is worth up to 3 points for a total of 12 points.
5. MISSED PARTICIPATION QUIZZES: A missed participation quiz cannot be made up under any circumstances; it will be will be assigned a score of zero. (No exceptions, regardless of the reason, including [but not limited to] medical, family, work, and transportation emergencies.)
Make-ups
1. One and only one (1) make-up is allowed (either a test or a technical quiz). Note that participation quizzes and Test 4 cannot be made-up under any circumstances.
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.
3. You must provide a valid and bona fide reason for missing the exam or technical quiz when it was originally scheduled, supported and verified by documentation. Without a bona fide reason and supporting documentation, your request for a make-up will be denied. All decisions are final; there is no appeal.
4. Valid and bona fide reasons for missing an exam or recitation quiz are medical emergency, family emergency (immediate family only), or job (full-time career employment ONLY; not part-time jobs) requirements. Acceptable documentation is a doctor’s note in the case of personal or family illness, travel itinerary or tickets in the case of work travel. Transportation and/or parking issues are not valid reasons for missing a quiz or exam.
5. Re-testing to replace scores already earned on previous technical quizzes and/or exams is strictly prohibited and will not be allowed under any circumstances.
6. Make-up policies and procedures will be posted on the Blackboard OM 210 course website under “Announcements.” Once promulgated in this fashion, these documents will become a permanent attachment to this syllabus.
7. 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.
8. A missed exam or technical quiz will be assigned a score of zero until it is made-up. After the make-up, the earned score on the make-up will replace the zero and will be added into the final total course score.
9. The exam/quiz make-up day is tentatively set for Friday, July 22, 2016, 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 course as measured by the total point score earned by the student on all grading metrics in strict accordance with the table listed in item 7 below.
   ➢ Non-academic matters, including personal issues and 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 solely on the basis of the final total point score for the course with a maximum of 1268 points for the course; the final total point score is the sum of the scores earned on all tests, quizzes, and graded homework assignments.
   . Final course letter grade assignments on the 1268 point system are given in the table below.
5. Final total point scores are NOT “bumped” or rounded up to the next higher letter grade. Specifically, a final total point score of 912 will be assigned a course grade of C- and not C. (C- is unsatisfactory in the School of Business; C or better is required in OM 210 for acceptance into the School.)
6. There is no “extra credit” of any kind, for any reason.
7. The chart above will be adhered to strictly and without deviation or compromise.
<table>
<thead>
<tr>
<th>COURSE TOTAL SCORE *</th>
<th>COURSE GRADE</th>
</tr>
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<tbody>
<tr>
<td>FROM</td>
<td>UP TO</td>
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<tr>
<td>1243</td>
<td>1268</td>
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<tr>
<td>1179</td>
<td>1242</td>
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<td>888</td>
<td>912</td>
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<tr>
<td>761</td>
<td>887</td>
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<td>0</td>
<td>760</td>
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</tbody>
</table>

* Point ranges are inclusive.

Schedule
1. The Summer 2016 semester calendar is at http://registrar.gmu.edu/calendars/summer/.
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 Blackboard OM 210 course website.
3. There is no class on Monday, July 4, and Tuesday, July 5, because of the Independence Day holiday.
4. The exam/quiz make-up period is Friday, July 22. Time and location are TBA.
5. The last regular class is on Thursday, July 28. (Note that no reading days are scheduled for the Summer semester.)
6. In conformity with the Final Exam Schedule for the Summer semester at http://registrar.gmu.edu/calendars/summer/final-exams/, the Final Exam is scheduled for Friday, July 29, from 1:30 to 4:15 PM.
7. Scheduling conflicts with the Final Exam 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>
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</thead>
<tbody>
<tr>
<td><strong>Part I. Describing Technical Data and its Variability (Descriptive Statistics)</strong></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>
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<tr>
<td>General random variable and probability distribution concepts</td>
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<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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<tr>
<td>7. Sampling and sampling distributions</td>
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<tr>
<td>Sampling distribution of sample means</td>
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<td>8. Estimation theory</td>
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<tr>
<td>Point estimation</td>
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<td>Confidence interval estimation for means: $\sigma$ known and $\sigma$ unknown</td>
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<tr>
<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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<tr>
<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>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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<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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<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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