

Math 3026 Introduction to Statistics with Computers

Prontuario August 2010

Textbook: (You must buy this book)

Lipschutz & Schiller, Introduction to Probability and Statistics (Schaum's Outline Series), 2012.
(\$13.79 at amazon.com)

Supplementary Books: (You need not buy any of these books)

Milton, Statistical Methods in the Biological and Health Sciences, 3rd edition, McGraw-Hill, 1999.
Balan & Lamothe, Expect the Unexpected. A First Course in Biostatistics, World Scientific, 2011.
Glover & Mitchell, An Introduction to Biostatistics, 2nd edition, Waveland Press, 2008.
Seier & Joplin, Introduction to Statistics in a Biological Context, Creative Space, 2011.

Calculator: (All exams require proficiency in using a scientific calculator)

You will need a scientific calculator for the exams. The Casio fx 115 is highly recommended. It has an input similar to MS Office Equation editor. Graphics calculators, such as TI - 83 are not allowed on exams nor are various wireless communication gadgets.

ftp://math3026.exavault.com (Here you can download Chapters 3 and 4 of the textbook.)

Username: **m3026**

Password: **probbat**

Your computer may prevent access to this site. If this happens try using a different web browser or use Windows Explorer. You may wish to use another computer or temporarily turn off the Firewall.

Quizzes

A system of graded homework is an integral part of this course. Problems will be taken from the Textbook and from the Supplementary Books. The problems on the exams will be very closely related to those on the quizzes. This is the main function of the quizzes.

Section identification: Each of the 11 section will denoted by a capital letter: A, B, C, D, E, F, G, H, I, J, K.

Student identification : Each student will be given a student identification for this course consisting of the section letter, followed by two digits. For example the thirty-fifth student in section B will have the course ID of B35.

Student password: A password will be given to each student. The password starts with the student's course ID followed by a capital letter and two digits, again a capital letter and two digits. Thus student B35 could have a password like B35X01Y23. (This password is fictitious). Note that the number 0 is not equal to the letter O. Obtain your password from your instructor.

Download the quiz: Each quiz has a separate website hosted by Amazon Web Service.

Quiz 01 has the website: **<https://qz01.s3.amazonaws.com/list.html>**

Quiz 02 has the website: **<https://qz02.s3.amazonaws.com/list.html>** and so on.

The last part of the URL is case-sensitive.

Go to one of the above sites. Select the appropriate section folder. Next find your quiz. In order to obtain Quiz01 student B35 selects SecB and finds his quiz Qz01B35.pdf at the bottom. It is good practice not to open the pdf file within the internet browser. Instead do this: Move your mouse over your pdf file and right-click. Then press Save Target As or Save File As and choose a place for the file on your computer. Now you can open the file. You will only be asked once for your password if you use this procedure. Check if you have the correct quiz. This system does not work with student names. The top line consists of the quiz name, the student course identification, and the student password. Check all three of these. In our example student B35 has downloaded the first quiz. The top line reads: Qz01 B35 Access / Password: B35X01Y23

Solve problems on the quiz: Do your calculations **without intermediate round-off**. Learn how to store and then recall constants on your calculator. After obtaining your answer round-off to 5 digits, including possible decimal points and minus signs. On quizzes (but not on exams) the solution to each problem is usually given, with 1 digit having been replaced by $_$. The missing digit (and only this digit, not the whole number) constitutes your answer to the problem.

Submit your digit answers: When you have obtained the digit answers for **all** quiz problems, press the hyperlink located at the top of the quiz. A GoogleForm shows up. You must put your password given at the top of your quiz into the AccessControl textbox of the GoogleForm. **Submissions with incorrect AccessControl passwords will not be processed.** Enter your 1-digit answers into the text boxes of the GoogleForm. Check that you have not made a typing mistake. Go to the bottom of the GoogleForm and **enter OK in the last text box** of your form and then press **Submit**. You will receive a message that your input has been recorded. **Additional submissions of a quiz will not be processed.** Note the deadline given at the top of the quiz. **Submissions past the deadline will not be possible.** In the late afternoon and early evening internet connections may become overloaded. It is your responsibility that answers are received by Google. You can assure this by early submission.

Evaluation of a quiz: If your 1-digit answer to a problem is correct you receive 1 point. If your 1-digit answer is blank you receive 0 points. All other answers result in $-1/9 = -.11$ points. The minimum total score of a quiz is set at 0.

Scores of quizzes: The password-protected results of quizzes will be posted in the Sc folder on the web site where you downloaded the quiz. Each pdf file is password-protected.

What can go wrong

1. Student enters incorrect AccessControl password. Result: GoogleForm is not processed. Score=0
2. Student submits multiple GoogleForms. Result: The first submitted GoogleForm is evaluated and its Score is calculated. Subsequent submission of GoogleForms are ignored.
3. Student cannot access the internet or cannot access GoogleForms. Result: Score = 0. Student should have entered results a day earlier.
4. After the deadline access to the GoogleForm is denied: Result: Score=0

Exams

There will be four coordinated partial exams on the following dates:

1. Exam 1 (100 points): Wednesday, September 12, 5:30-7:30 pm,
 2. Exam 2 (100 points): Monday, October 8, 5:30-7:30 pm
 3. Exam 3 (100 points): Friday, November 2, 5:30-7:30 pm
 4. Exam 4 (100 points): Tuesday, December 4, 5:30-7:30 pm
 5. Furthermore there will be a coordinated Final Exam (200 points) on a date and time to be announced.
- All coordinated exams are held in classrooms, none in computer lab A209.

Evaluation of course work:

The lowest score of Exam 1, Exam 2, Exam 3, Exam 4 will be deleted.

The percentage of correct answers contained in all quizzes will constitute "Exam 5".

Average Score of Course = $[Ex1 + Ex2 + Ex3 + Ex4 - \text{Min}\{Ex1, Ex2, Ex3, Ex4\} + Ex5 + \text{Final Exam}]/6$

Topics for Exam 1:

Chapter 3 BASIC PROBABILITY

- 3.1 Introduction. 3.2 Sample Space and Events. 3.3 Axioms of Probability.
3.4 Finite Probability Spaces. 3.5 Infinite Sample Spaces.

Chapter 4 CONDITIONAL PROBABILITY AND INDEPENDENCE

- 4.1 Introduction. 4.2 Conditional Probability. 4.3 Finite Stochastic Processes and Tree Diagrams. 4.4 Total Probability and Bayes' Formula. 4.5 Independent Events.
4.6 Independent Repeated Trials.

Chapter 5 RANDOM VARIABLES

5.1 Introduction. 5.2 Random Variables. 5.3 Probability Distribution of a Finite Random Variable. 5.4 Expectation of a Finite Random Variable. 5.5 Variance and Standard Deviation. 5.6 Joint Distribution of Random Variables. 5.7 Independent Random Variables. 5.8 Functions of a Random Variable. 5.9 Discrete Random Variables in General. 5.10 Continuous Random Variables. 5.11 Cumulative Distribution Function. 5.12 Law of Large Numbers.

For the most part lectures will be restricted to discrete random variables.

Exam 1 will cover Chapter 3, Chapter 4, and parts of Chapter 5.

Topics for Exam 2:

Chapter 6 BINOMIAL AND NORMAL DISTRIBUTIONS .

6.1 Introduction. 6.2 Bernoulli Trials, Binomial Distribution. 6.7 Multinomial Distribution. 6.6 Poisson Distribution. 6.3 Normal Distribution. 6.4 Evaluating Normal Probabilities

Chapter 1 DESCRIPTIVE STATISTICS. (Univariate)

1.1 Introduction. 1.2 Frequency Tables, Histograms. 1.3 Measures of Central Tendency: Mean and Median. 1.4 Measures of Dispersion: Variance and Standard Deviation; 1.5 Measures of Position: Quartiles and Percentiles. 1.6 Measures of Comparison: Standard Units and Coefficient of Variation. 1.7 Additional Descriptions of Data.

Chapter 7 SAMPLING DISTRIBUTIONS

7.1 Introduction: Sampling With and Without Replacement. 7.2 Sample Mean. 7.3 Sample Proportion. 7.4 Sample Variance.

Topics for Exam 3:

Chapter 8 CONFIDENCE INTERVALS FOR A SINGLE POPULATION.

8.1 Parameters and Statistics. 8.2 The Notion of a Confidence Interval. 8.3 Confidence Intervals for Means. 8.4 Confidence Intervals for Proportions.

Chapter 9 HYPOTHESES TESTS FOR A SINGLE POPULATION

9.1 Introduction: Testing Hypotheses About Parameters. 9.2 Hypotheses Tests for Means. 9.3 Hypotheses Tests for Proportions.

Topics for Exam 4:

Chapter 10 INFERENCE FOR TWO POPULATIONS

10.1 Confidence Intervals for the Difference of Means. 10.2 Hypotheses Tests for the Difference of Means. 10.3 Confidence Intervals for Differences of Proportions. 10.4 Hypotheses Tests for Differences of Proportions.

Chapter 11 CHI-SQUARE TESTS AND ANALYSIS OF VARIANCE.

11.1 Chi-Square Goodness-of-Fit Test. 11.2 Chi-Square Test for Equal Distributions. 11.3 Chi-Square Test for Independent Attributes.

Chapter 1 DESCRIPTIVE STATISTICS (Bivariate)

1.8 Bivariate Data, Scatterplots. 1.9 Correlation Coefficient. 1.10 Methods of Least Squares, Regression Line, Curve Fitting.
