PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ELEMENTARY PROBABILITY AND STATISTICS
MATH 1530

Class Hours: 2.0  Credit Hours: 3.0
Laboratory Hours: 2.0  Revised: Fall 08

Catalog Course Description:

Topics include elementary probability theory, concepts of descriptive statistics, discrete and continuous distributions, hypothesis testing, confidence intervals, sample sizes, correlation, regression, multinomial and contingency tables. Noncalculus based. Computer applications will be investigated.

Entry Level Standards:

Students must be able to read, write, and speak at the college level.

Prerequisites:

High school algebra I and algebra II and ACT math score of at least 19; or DSPM 0850 or equivalent math placement score.

Textbook(s) and Other Course Materials:

Textbooks:
Triola, Mario F.  Statdisk Student Laboratory Manual and Workbook, 10th ed. Pearson Addison-Wesley.  (Not required by all instructors.)

Other Equipment:
A scientific calculator that will compute one- and two-variable statistics is required. The TI-83, TI-83 Plus, TI-84 or TI-84 Plus graphing calculators are recommended.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to statistics (1-1); types of data (1-2); critical thinking (13); design of experiments (1-4); frequency distributions (2-2); histograms (2-3) (computer applications will be investigated during each of the remaining weeks as needed)</td>
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<tr>
<td>2</td>
<td>Statistical Graphics (2-4); measures of center (3-2), variation (3-3), and relative standing (3-4); boxplots and exploratory data analysis (3-5); review</td>
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<tr>
<td>3</td>
<td>Test 1; fundamentals of probability (4-2); addition and multiplication rules (4-3 &amp; 4-4)</td>
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<tr>
<td>4</td>
<td>Random variables, probability distributions, and expectation (5-2); Binomial probability distributions (5-3); the mean, variance, and standard deviation for binomial distributions (5-4)</td>
</tr>
</tbody>
</table>
Review; Test 2; standard normal distribution (6-2)

Applications of normal distributions (6-3); the Central Limit Theorem (6-5);

Confidence intervals and minimum sample sizes for estimating a population proportion (6-2); estimating a population mean (sigma unknown) (7-4)

Minimum sample size in estimating a population mean (7-3); review; Test 3

Basics of hypothesis testing and P-values (8-2); testing a claim about a population proportion (8-3)

Testing a claim about a population mean using a t test (8-5)

Testing a claim about standard deviation or variance (8-6); review; Test 4;

Linear regression (10-2) and correlation (10-3);

Chi-Square tests; Multinomial experiments and Goodness-of-fit Test (11-2);
Contingency Tables: Tests of independence and homogeneity (11-3)

Review; Test 5; Review for final

II. Course Objectives*:

A. Collect and assemble quantitative data making wide use of tables and graphs. VI.1,4,6

B. Analyze a given set of data and accurately describe the data by interpreting the significance of the mean, median, mode, and standard deviation. VI.1,4,5,6

C. Use the basic principles of probability. VI.1,2,4,6

D. Develop a working knowledge of probability and its application to the binomial and the normal distribution. VI.1,2,3,4,5,6

E. Understand sampling and sampling distributions and their applications in business and industry. VI.1,2,3,4,5,6

*Roman numerals after course objectives reference TBR's general education goals.

III. Instructional Processes*:

Students will:

1. Use a scientific calculator and/or computer software to compute descriptive statistical values and to aid in analysis of real world problems. Technological Literacy Outcome,

2. Complete laboratory exercises that include topics such as collection and analysis of real world data. Mathematics Outcome, Active Learning Strategy, Transitional Strategy

3. Work collaboratively on laboratory exercises to explore probability and statistical concepts. Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategy, Communication Outcome

4. Construct charts, tables, and graphs to provide visual descriptions of numerical
data. *Mathematics Outcome*

5. Identify and translate real-life data into empirical probability models. *Mathematics Outcome, Transitional Strategy*

*Strategies and outcomes listed after instructional processes reference TBR's goals for strengthening general education knowledge and skills, connecting course work to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.*

**IV. Expectations for Student Performance*:*

Upon successful completion of this course, the student should be able to:

1. Construct a frequency distribution. A
2. Graph a frequency distribution as a histogram. A
3. Solve for the mean of raw data scores and frequency distributions. B
4. Solve for variance and standard deviation of raw data scores and frequency tables. B
5. Determine the mean, variance, and standard deviation of a probability distribution. D
6. Calculate mathematical expectation. D
7. Solve for the probability, mean, variance, and standard deviation of binomial experiments. C
8. Solve basic probability problems. C
9. Apply the addition and multiplication rules. C
10. Define and use the rules of complementary events. C
11. Find the z-score. B
12. Utilize the z-score when finding probabilities of nonstandard normal distributions. D
13. Algebraically find the value of the random variable when given the corresponding area under the density curve. D
14. Utilize the central limit theorem to find the probabilities of sample means. D, E
15. Test hypotheses about population proportions and means. D, E
16. Utilize confidence intervals. D, E
17. Calculate appropriate sample sizes for tests of proportions and means. D, E
18. Determine linear correlation and determine a linear regression equation. E
19. Test hypotheses involving multinomial experiments and contingency tables. E

*Letters after performance expectations reference the course objectives listed above.*

**V. Evaluation:**
A. Testing Procedures:

   Students are evaluated primarily on the basis of tests and a final exam. A minimum of 5 tests and the final exam are suggested. In addition, instructors may consider using quizzes, homework, or other assignments for assessment as deemed appropriate.

B. Laboratory Expectations:

   Instructor should use Statdisk (Lab Manual available), Excel, Java Applets, and/or other statistical computer packages to investigate and analyze data in support of classroom lectures. Consider at least one lab activity for each chapter covered in the textbook.

C. Field Work:

   As assigned by instructor. Suggest instructor consider at least one project involving data collection and investigation using methods discussed in class.

D. Other Evaluation Methods:

   None

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93 - 100</td>
<td>A</td>
</tr>
<tr>
<td>88 - 92</td>
<td>B+</td>
</tr>
<tr>
<td>83 - 87</td>
<td>B</td>
</tr>
<tr>
<td>78 - 82</td>
<td>C+</td>
</tr>
<tr>
<td>70 - 77</td>
<td>C</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
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VI. Policies:

A. Attendance Policy:

   Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

B. Academic Dishonesty:

   Individual instructors must distribute their policy on academic dishonesty during the first week of classes. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or a zero for the assignment or (2) an F for the course.

C. Accommodations for disabilities:

   If you need accommodations because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Please see the instructor privately after class or in his/her office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127
or 131 or by phone: 694-6751(Voice/TTY) or 539-7153.