INTRODUCTION TO STATISTICS
MATH 2050

Class Hours: 2.0  Credit Hours: 3.0
Laboratory Hours: 2.0  Date Revised: Spring 07

Catalog Course Description:

Descriptive statistics, including bivariate trends; time series; concepts of probability and probability distributions; binomial and normal distributions; linear correlation and regression; estimation and significance tests for means; contingency tables, chi-square tests for goodness of fit and independence. A computer laboratory component is required.

Entry Level Standards:

A thorough knowledge of algebraic functions is necessary for entrance to this course. Students should be able to read on the college level and reason logically.

Prerequisite:

MATH 1830 or MATH 1910

Textbook(s) and Other Reference Materials Basic to the Course:

Textbook:

References:
Triola, Mario F. Elementary Statistics. 9th ed. Addison Wesley Longman.

Personal Equipment:
At minimum, a scientific calculator with built in statistical routines to calculate means and standard deviations. A graphing calculator is recommended, but not required.

I. Week/Unit/Topic Basis:

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Statistical applications in business and economics; data; data sources; descriptive statistics; statistical inference and probability; summarizing qualitative data. Chapters 1, 2</td>
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<tr>
<td>2</td>
<td>Summarizing quantitative data; exploratory data analysis; cross-tabulations and scatter diagrams. Chapter 3</td>
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<td>3</td>
<td>Measures of location; measures of variability; some uses of the mean and the standard deviation; exploratory data analysis; measures of the association between two variables; computing measures of location and dispersion for grouped data. Chapter 3</td>
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<tr>
<td>4</td>
<td>Experiments, the sample space, and counting rules. Chapter 4</td>
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</table>
Assigning probabilities to experimental outcomes; events and their probabilities; some basic relationships of probability; conditional probability; random variables. Chapter 4

Discrete probability distributions; expected value and variance; the binomial probability distribution; the uniform probability distribution. Chapter 5

The normal probability distribution; normal approximation of binomial distributions; simple random sampling; point estimation; introduction to sampling distributions. Chapters 6, 7

Sampling distribution of the sample mean; sampling distribution of the sample proportion; properties of point estimators; other sampling methods. Chapter 7

Interval estimation of a population proportion and mean. Determining sample size. Chapter 8

Developing null and alternative hypothesis; type I and type II errors; Tests about a population mean and proportion. Chapters 9

Tests of the differences between the means of two populations, independent and matched samples. Inferences about the difference between the proportions of two populations; Chapter 10

Hypothesis tests about the difference between the variances of two populations; Goodness of fit test for multinomial populations; test of independence using contingency table. Chapters 11, 12

The simple linear regression model; the least squares method. Chapter 14

The coefficient of determination; residual analysis, outliers and influential observations; the components of a time series; using smoothing methods in forecasting. Chapter 14

Comprehensive final exam

II. Course Objectives*:

A. Demonstrate descriptive methods of statistics, including frequency distribution, measures of central tendency, and measures of variation. VI.1-5

B. Examine bivariate data, cross-tabulations, sorting, graphics, and covariance and correlation. VI.1-5

C. Investigate probabilistic concepts. VI.1-5

D. Explore sampling and sampling distributions. VI.1-5

E. Master hypothesis testing. VI.1-5

F. Determine and interpret correlation and regression analysis. VI.1-5

G. Perform time series analysis. VI.1-5

H. Apply the most common probability distributions. VI.1-5

*Roman numerals after course objectives reference TBR’s general education goals.
III. Instructional Processes*:

Students will:

1. Use statistical software and/or statistical capabilities of the scientific calculator to analyze real-world problems. Examples include hypothesis testing and generating descriptive statistics. *Mathematics Outcome, Transitional Strategy, Active Learning Strategy

2. Work collaboratively on laboratory exercises to explore concepts involving probability. *Mathematics Outcome, Active Learning Strategy

3. Use critical thinking skills to interpret data, drawing conclusions, and state conclusions in written form. *Mathematics Outcome, 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, Active Learning Strategy

*Strategies and outcomes listed after instructional processes reference TBR’s goals for strengthening general education knowledge and skills, connecting coursework 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 frequency distributions and frequency histograms. A, D

2. Calculate measures of central tendency. A

3. Calculate measures of dispersion. A

4. Construct scatter diagrams. B

5. Calculate correlation coefficients and establish the relative strength of the linear relationships between two variables. B, D, F

6. Construct time series charts and interpret the results. G

7. Calculate probabilities using both the classical and the empirical approaches. C

8. Calculate probabilities based on both the standardized and non-standard normal distributions. D, H

9. Perform hypothesis tests, including, but not restricted to, means testing (both large and small samples), and tests of independence and goodness of fit. D, E, H

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

V. Evaluation:
A. Testing Procedures:

Students are evaluated on the basis of tests, and at the teacher’s discretion, quizzes, homework, computer projects, and case studies. A minimum of four major unit tests and a comprehensive departmental final will be given. All tests will be administered during scheduled lab times.

B. Laboratory Expectations:

At least half of all class meetings take place in the computer lab. A minimum of ten of these sessions will involve assignments to be turned in and graded, with the lab average making up a minimum of ten percent of the course grade.

C. Field Work:

None

D. Other Evaluation Methods:

None

E. Grading Scale:

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<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
<td>93 - 100</td>
</tr>
<tr>
<td>B+</td>
<td>88 - 92</td>
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<tr>
<td>B</td>
<td>83 - 87</td>
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<tr>
<td>C+</td>
<td>78 - 82</td>
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<tr>
<td>C</td>
<td>70 - 77</td>
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<tr>
<td>D</td>
<td>60 - 69</td>
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<tr>
<td>F</td>
<td>Below 60</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 policies on academic dishonesty and calculator use 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.

Posted: February 15, 2007