PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

INTRODUCTION TO STATISTICS
MTH 2010

Class Hours: 2.0 | **Credit Hours: 3.0**

Laboratory Hours: 2.0 | **Date Revised: Spring 99**

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:

MTH 1255 or MTH 1410

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

Textbook:
Anderson, D.R., D.J. Sweeney, and T.A. Williams. *Statistics for Business and Economics*. 7th ed. Cincinnati, OH: South-Western College Publishing, 1998.
References:
Triola, Mario F. *Elementary Statistics*. 5th ed. Redwood City, CA: The Benjamin/Cummings Publishing Company, Inc., 1992.
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:

Week	Topic
1	Statistical applications in business and economics; data; data sources; descriptive statistics; statistical inference and probability; summarizing qualitative data. 1.1-1.5, 2.1
2	Summarizing quantitative data; exploratory data analysis; cross-tabulations and scatter diagrams. 2.2-2.4
3	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. 3.1-3.6

4 Experiments, the sample space, and counting rules. 4.1

5 Assigning probabilities to experimental outcomes; events and their probabilities; some basic relationships of probability; conditional probability; random variables. 4.2-4.5, 5.1

6 Discrete probability distributions; expected value and variance; the binomial probability distribution; the uniform probability distribution. 5.2-5.4, 6.1

7 The normal probability distribution; normal approximation of binomial distributions; simple random sampling; point estimation; introduction to sampling distributions. 6.2-6.3, 7.2-7.4

8 Sampling distribution of the sample mean; sampling distribution of the sample proportion; properties of point estimators; other sampling methods. 7.5-7.8

9 Interval estimation of a population mean, large sample case; interval estimation of a population mean, small sample case; determining sample size. 8.1-8.3

10 Interval estimation of a population proportion; developing null and alternative hypothesis; type I and type II errors; one tailed tests about a population mean, large sample case; two tailed tests about a population mean, large sample case. 8.4, 9.1-9.4

11 Tests about a population mean, small sample case; tests about a population proportion; hypotheses testing and decision making; determining the sample size for a hypothesis test about a population mean; estimation of the differences between the means of two populations, independent samples. 9.5-9.7, 9.9, 10.1

12 Hypothesis tests about the difference between the means of two populations, independent samples; inferences about the difference between the means of two populations, matched samples; inferences about the difference between the proportions of two populations; goodness of fit test for multinomial populations; test of independence using contingency table. 10.2-10.4, 12.1, 12.2

13 The simple linear regression model; the least squares method. 14.1, 14.2

14 The coefficient of determination; residual analysis, outliers and influential observations; the components of a time series; using smoothing methods in forecasting. 14.3, 14,8, 18.1-18.2

15 Review and completion of computer lab exercises

16 Comprehensive final exam

II. Course Objectives*:

A. Demonstrate descriptive methods of statistics, including frequency distribution, measures of central tendency, and measures of variation. I

B. Examine bivariate data, cross-tabulations, sorting, graphics, and covariance and correlation. I, II

C. Investigate probabilistic concepts. II, V

D. Explore sampling and sampling distributions. I, II

E. Master hypothesis testing. II, IV, V

F. Determine and interpret correlation and regression analysis. I

G. Perform time series analysis. I

H. Apply the most common probability distributions. II, V

*Roman numerals after course objectives reference goals of the Mathematics department.

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. *Numerical Literacy Outcome, Transitional Strategy, Active Learning Strategy*

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

3. Use critical thinking skills to interpret data, drawing conclusions, and state conclusions in written form. *Numerical Literacy Outcome, Communication Outcome*

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

5. Identify and translate real-life data into empirical probability models. *Numerical Literacy Outcome, Information Literacy Outcome, Transitional Strategy, Active Learning Strategy*

*Strategies and outcomes listed after instructional processes reference Pellissippi State□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, quizzes, homework, computer projects, and case studies. A minimum of six major unit tests and a mandatory comprehensive departmental final will be given. All tests will be administered during scheduled lab times.

B. Laboratory Expectations:

Alternating class meetings take place in the mathematics department computer lab. A minimum of ten of theses 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:

93 - 100	A
88 - 92	B+
83 - 87	B
78 - 82	C+
70 - 77	C
60 - 69	D
Below 60	F

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 class.