COUNTY COLLEGE OF MORRIS
Course Information Outline

Course Title Statistics - Honors **PREFIX&NUMBER** MAT 180

Lecture Hours 45 **Laboratory Hours** 0 **Credit Hours** 3 **Course Fee** None

Department Chairperson Approval J. Monaghan **Date** 05-25-2010

Division Dean Approval P. Enright **Date** 5-28-10

1. Catalog Course Description

An introduction to the principles of statistical methods. The course will integrate spreadsheet software to cover such topics as descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, elementary hypothesis testing and confidence intervals. Comprehensive case studies will be covered throughout the semester.

2. Prerequisite(s)

Permission of honors coordinator or department.

3. Co-requisite(s)

None

4. Textbooks

Sullivan, Michael III, *Fundamentals of Statistics*, 3rd ed. (Pearson Education, 2008).

5. Supplementary Books and/or Materials

None

6. Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations. (Information will be used to determine differential funding category.)

None

7. Course Content (List of Topics)

- Introduction; data collection; observational studies, experiments, sampling techniques
- Frequency distributions, statistical graphs, stem-and-leaf plots, dot plots, shapes of distributions
- Measures of central tendency and dispersion
- Measures of position, 5-number summary, box plot
- Scatter diagrams, correlation, least-squares regression, coefficient of determination
- Probability rules, addition rule, complements, independence and multiplication rule
- Conditional probability and general multiplication rule
- Counting techniques
- Discrete probability distributions, binomial probability distribution
- Normal probability distribution: properties, applications, assessing normality

- Normal approximation to the binomial probability distribution
- Sampling distributions
- Confidence intervals about a population mean, population standard deviation known and unknown
- Hypothesis tests for a population mean, population standard deviation known and unknown
- Applications using statistical technology

8. Statement of Course LEARNING OUTCOMES

- **Summarize** data using tables, graphs and measures of statistics
- **Use** the z-table to compute normal probabilities
- **Construct** confidence intervals and **conduct** hypothesis tests for the mean and interpret the results
- **Calculate** the correlation coefficient and **construct** least-squares linear regression equations
- **Use** basic rules of probability to compute theoretical, empirical and binomial probabilities
- **Use** statistical software to organize data, **compute** measures of descriptive and inferential statistics, and **construct** basic statistical graphs

9. Statement of Relation to Curriculum(s)

Honors Statistics is an optional course for students3in the Honors program.

COUNTY COLLEGE OF MORRIS
COURSE INFORMATION OUTLINE

Course Honors Statistics Cat. No. MAT - 180

Class Hours 45 Clinical / Laboratory Hours / Recitation 0 Credit Hours 3 Course Fee None

Faculty Course Coordinator None

Department Chairperson Approval J. R. Monaghan Approval Date

Division Dean Approval M. C. Ayres Approval Date

1. Prerequisite (Last Course or Courses) MAT 014 or equivalent

2. Co-requisite None

3. Textbooks: Sincich, Levine, Stephan: Practical Statistics by Example Using Microsoft Excel. (Prentice-Hall, Inc). ISBN 0-13-096083-7

4. Supplementary Books : None

5. Supplementary Materials: None

6. Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations. (Information will be used to determine differential funding category.): None

7. Statement Course Objectives: Honors Statistics is an enriched statistics course providing knowledge of data collection, summarization, data analysis and decision-making.

8. Statement of Relation to Curriculum(s): Honors Statistics is an optional course for students in the Honors program.

9. Catalog Course Description (Please include when course will be offered -- Fall, Spring, Summer, etc.): An introduction to the fundamental principles of statistical methods. The course will integrate spreadsheet software to cover such topics as descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, elementary hypothesis testing and confidence intervals. Comprehensive case studies will be covered throughout the semester.

Cat. No._____

10. Course Outline

Syllabus

Period	Text sections	Topics
	Chap. 1	Statistics and data
	Chap. 2	Exploring data with graphs and tables
	Chap. 3	Exploring data with numerical descriptive measures
	Case study	Project analysis, using methods found in Chaps. 2 and 3
	Chap. 4	Basic concepts of probability
	Chap. 5	Discrete probability distributions
	Chap. 6	Normal probability distributions
	Case study	Project analysis, using probability and sampling distributions
	Chap. 7	Estimation of population parameters, using confidence intervals--one sample
	Chap. 8	Testing hypotheses about population parameters — one sample
	Chap. 10	Regression analysis

County College of Morris
214 Center Grove Rd.
Randolph, NJ 07869-2086
(973) 328-5000

MAT180 - STATISTICS—HONORS 2/1/01
3 hrs/wk - 3 cr. BEGINNING FALL 2001

Catalog description: An introduction to the principles of statistical methods. The course will integrate spreadsheet software to cover such topics as descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, elementary hypothesis testing and confidence intervals. Comprehensive case studies will be covered throughout the semester.

Pre-requisite: MAT014 or equivalent. Some computer knowledge is helpful but is not required.

Text: Sincich, Levine, Stephan: Practical Statistics by Example Using Microsoft Excel. (Prentice-Hall, Inc.). ISBN 0-13-096083-7.

Supplementary materials: None.

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Preliminary Syllabus for Honors Statistics

Textbook: *Practical Statisitics by Example Using Microsoft Excel*

Authors: Sincich, Levine and Stephan

Chapter 1 - *Statistics and Data*

Section 1.1 What is Statistics?
1.2 Types of Data
1.3 Descriptive vs. Inferential Statistics
1.4 Data Collection
1.5 Random Sampling
1.6 Other Types of Samples

1.E.1 Using Microsoft Excel to Select a Random Sample

Chapter 2 - *Exploring Data With Graphs and Tables*

Section 2.1 Objective of Data Description
2.2 Qualitative Data: Frequency Table, Bar Graphs and Pie Charts
2.3 Quantitative Data: Frequency Table, Stem and Leaf Displays and Histograms

2.E.1 Using Microsoft Excel to Describe a Single Qualitative Variable

2.E.2 Using Microsoft Excel to Describe a Single Quantitative Variable

Chapter 3 - *Exploring Data with Numerical Descriptive Measures*

Section 3.1 Types of Numerical Descriptive Measures
3.2 Summation Notation
3.3 Measures of Central Tendency: Mean, Median and Mode
3.4 Measures of Data Variation: Range, Variance and Standard Deviation
3.5 Interpreting Standard Deviation
3.6 Measures of Relative Standing: Percentiles and Z scores
3.7 Box and Whisker Plots
3.8 Measures for Detecting Outliers
3.10 Numerical Descriptive Measures for Populations

3.E.1 Using Microsoft Excel to Explore Data with Numerical Descriptive Measures

A. Data Analysis Descriptive Statistics
B. Box-and-Whisker Plot

Case Study - *Project Analysis* - Utilization of the Methods found in Chapters 2 and Chapter 3.

Chapter 4 - *Probability: Basic Concepts*

Section 4.1 Role of Probability in Statisics
4.2 Experiments, Events and the Probability of an Event
4.5 Conditional Probability
4.6 Additive and Multiplicative Laws of Probability
4.3 Probability Rules for Mutually Exclusive Events
4.4 Combinatorial Rule for Counting Simple Events

Chapter 5 - *Discrete Probability Distributions*

Section 5.1 Random Variables
5.2 Probability Models for Discrete Random Variables
5.3 The Binomial Probability Distribution

5.E.1 Using Microsoft Excel to Obtain the Expected Value and Variance of a Probability Distribution

5.E.2 Using Microsoft Excel to Obtain Binomial Distributions

Chapter 6 - *Normal Probability Distributions*

Section 6.1 Probability Models for Continuous Random Variables
6.2 The Normal Probability Distribution
6.3 Descriptive Measures for Assessing Normality
6.4 Sampling Distributions

6.5 Sampling Distributions of the Mean and the Central Limit Theorem

6.E.1 Using Microsoft Excel to Obtain Normal Probabilities

6.E.2 Using Microsoft Excel to Construct Normal Probability Plots

6.E.3 Using Microsoft Excel to Simulate Sampling Distributions

Case Study - *Project Analysis* - Utilizing Probability and Sampling Distributions

Chapter 7 - *Estimation of Population Parameters Using Confidence Intervals: One Sample*

Section 7.1 Point Estimators
7.2 Estimation of a Population Mean - Normal (z) Statistic
7.3 Estimation of a Population Mean - Student's (t) Statistic
7.5 Choosing a Sample Size

7.E.1 Using Microsoft Excel to Obtain the Confidence Interval Estimate for the Mean - (z) Statistic

7.E.2 Using Microsoft Excel to Obtain the Confidence Interval Estimate for the Mean - (t) Statistic

7.E.4 Using Microsoft Excel to Determine the Sample Size for Estimating the Mean

Chapter 8 - *Testing Hypothesis about Population Parameters: One Sample*

Section 8.1 The Relationship betweeen Hypothesis Tests and Confidence Intervals
8.2 Hypothesis-Testing Methodology: Formulating Hypotheses

Chapter 10 - Regression Analysis

Section 10.1 Introduction to Regression Models
10.2 The Straight-Line Model: Simple Linear

Regression

10.3 Estimating and Interpreting the Model Parameters

10.E.1 Using Microsoft Excel to Generate Scatter Diagrams and a Regression Line

10.E.2 Using Microsoft Excel for Simple Linear Regression

COUNTY COLLEGE OF MORRIS
PROCESS FOR COURSE DEVELOPMENT
SIGN-OFF CHECK SHEET

Course Changes: Revision/New Course/Course Discontinuance

COURSE: MAT 180 Statistics - Honors

		Signature	Date
1.1	Department consensus	JMoraghan	01-29-01
1.1.1	Teacher	JMoraghan	01-29-01
1.1.2	Other Departments	—	
1.1.2.1	Other Departments (as needed)	—	
1.1.2.2	Other Departments (as needed)	—	
1.2	Consult Dean Raulf		
1.2.1	Work Load/Space Requirements	—	
1.3	External Review	—	
1.3.1	Advisory Committee	—	
	Four-Year College	—	
1.4	Department Chairperson	JMoraghan	
1.5	Division Dean		1/29/01
1.5.1	Other Division Deans		2/20/01
1.6	Vice President	Judith F. Raulf	2/20/01
1.6.1	Board of Trustees		
1.7	Discontinuance		

September 1994

County College of Morris
214 Center Grove Road
Randolph, NJ 07869-2086

(973) 328-5000

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