

Northern Marianas College

CURRICULUM ACTION REQUEST

Effective Semester / Session: Summer 2007

Type of Action:

- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: MA 151

Course Title: Introduction to Statistics

Reason for initiating, revising, or canceling:

This course guide is being modified to correct the math placement level, to reflect the enhancement of the student learning outcomes, and to reflect the change in the department name.

Proposer

Date

2/28/07

Department Chair

Date

3/1/07

English and Format Reviewer

Date

3/16/07

Dean of Academic Programs and Services

Date

3/19/07

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Course: MA 151 Introduction to Statistics

1. Department

Sciences, Mathematics, Health & Athletics

2. Purpose

This course is designed to introduce the student to the basic principles of statistics and probability theory, guide the student through the wide range of statistical applications, and give the student an introduction to the use of technology in the effective processing and analysis of statistical information. The course also provides the necessary material needed for an understanding of statistical distributions, estimation, hypothesis testing, and linear regression; and is designed to prepare the student for success in further courses in applied statistics.

3. Description

A. Required/Recommended Textbook(s) and Related Materials

Required:

Bluman, Alan G., Elementary Statistics, 2nd edition, New York: McGraw-Hill, NY, 2003.

Readability level: Grade 12.

B. Contact Hours

1. **Lecture:** 3 hours per week / 45 per semester
2. **Lab:**
3. **Other:**

C. Credits

1. **Number:** 3
2. **Type:** Regular degree credits

D. Catalogue Course Description

This course is designed to introduce the student to the basic principles of descriptive and inferential statistics, as well as the basic probability theory needed for an understanding of statistical distributions, estimation, hypothesis testing, and linear regression. The course provides the student with the basic skills necessary to succeed in further courses in applied statistics, as well as an appreciation of the critical interpretation of statistical data, the ranges of application of statistics, and an introduction to the use of technology in the effective processing and analysis of information. English Placement Level: EN

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101. Math Placement Level: MA 161 or successful completion of MA 132.

E. Degree or Certificate Requirements Met by Course

A "C" grade or better in this course satisfies a core course requirement in mathematics for an NMC associate-level degree program.

F. Course Activities and Design

Course activities include lecture, discussions, homework assignments, tests, quizzes, and a comprehensive final exam

4. Course Prerequisite(s); Concurrent Course Enrollment; Required English/Mathematics Placement Level(s)

English Placement Level: EN 101.

Math Placement Level: MA 161 or successful completion of MA 132.

5. Estimated Cost of Course; Instructional Resources Needed

Cost to the Student: Tuition for a 3-credit course; cost of textbook and graphing calculator.

Cost to the College: Instructor's salary; use of A-V equipment.

Instructional resources needed for this course include: computers and software, TV/VCR, chalk.

6. Method of Evaluation

Students grades will be based on the regular letter grade system as described below:

A: Excellent – grade points: 4.0

B: Above average – grade points: 3.0

C: Average – grade points: 2.0

D: Below average – grade points: 1.0

F: Failure – grade points: 0.0

NMC's grading and attendance policies will be followed.

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7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

- 1.0 The Nature of Probability and Statistics
 - 1.1 Introduction
 - 1.2 Descriptive and Inferential Statistics
 - 1.3 Variables and Types of Data
 - 1.4 Data Collection and Sampling Techniques
 - 1.5 Observational and Experimental Studies
 - 1.6 Computers and Calculators
- 2.0 Frequency Distributions and Graphs
 - 2.1 Introduction
 - 2.2 Organizing Data
 - 2.3 Histograms, Frequency Polygons, and Ogives
 - 2.4 Other Types of Graphs
 - 2.5 Paired Data and Scatter Plots
- 3.0 Data Description
 - 3.1 Introduction
 - 3.2 Measures of Central Tendency
 - 3.3 Measures of Variation
 - 3.4 Measures of Position
 - 3.5 Exploratory Data Analysis
- 4.0 Counting Techniques
 - 4.1 Introduction
 - 4.2 Tree Diagrams and the Multiplication Rule for Counting
 - 4.3 Permutations and Combinations
- 5.0 Probability
 - 5.1 Introduction
 - 5.2 Sample Spaces and Probability
 - 5.3 The Addition Rules for Probability
 - 5.4 The Multiplication Rules and Conditional Probability
- 6.0 Discrete Probability Distributions
 - 6.1 Introduction
 - 6.2 Probability Distributions
 - 6.3 Mean, Variance, and Expectation
 - 6.4 The Binomial Distribution

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- 7.0 The Normal Distribution
 - 7.1 Introduction
 - 7.2 Properties of the Normal Distribution
 - 7.3 The Standard Normal Distribution
 - 7.4 Applications of the Normal Distribution
 - 7.5 The Central Limit Theorem
 - 7.6 The Normal Approximation to the Binomial Distribution

8. Instructional Goals

This course will introduce students to:

- 1.0 The nature of statistical knowledge and how to assess the strengths and weaknesses of statistical arguments;
- 2.0 The basic principles of descriptive statistics and summary statistics, and the use of descriptive statistics and summary statistics in describing data sets;
- 3.0 Probability distributions, sampling distributions and the applications in a variety of contexts;
- 4.0 Statistical inference in regard to single-variable populations, and to articulating an understanding of the results;
- 5.0 The applications of critical thinking skills to statistical concepts;
- 6.0 The differences between samples and populations;
- 7.0 Histograms, scatter plots, stem-and-leaf displays, box-and-whisker plots, and other graphical modes of presentation;
- 8.0 The basic rules of probability and counting techniques;
- 9.0 Normal and Binomial probability distributions;
- 10.0 Confidence intervals and their significance in making inferences about a population; and
- 11.0 The role of technology in processing information.

9. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

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- 1.0 Demonstrate an understanding of the nature of statistical knowledge and assess the strength and weaknesses of statistical arguments;
- 2.0 Define the basic principles of descriptive statistics and summary statistics, and use descriptive statistics and summary statistics to describe data sets;
- 3.0 Compute probability distributions, sampling distributions, and give examples of their applications in a variety of contexts;
- 4.0 Articulate an understanding of the results of statistical inference in regard to single-variable populations;
- 5.0 Apply critical thinking skills to statistical concepts such as data description, counting techniques, probability distributions, confidence intervals, and hypothesis testing;
- 6.0 Identify the differences between samples and populations;
- 7.0 Render and interpret histograms, scatter plots, stem-and-leaf displays, box-and-whisker plots, and other graphical modes of presentation;
- 8.0 Demonstrate knowledge of the basic rules of probability and counting techniques;
- 9.0 Use the Normal and Binomial probability distributions;
- 10.0 Compute confidence intervals and know their significance, and make inferences about a population in a variety of contexts; and
- 11.0 Use hand-held technology and computers in basic statistical investigations.

10. **Assessment Measures**

Assessment of student learning may include, but not be limited to, the following:

- 1.0 Periodic testing to evaluate the student's knowledge and abilities in cognitive reasoning and the interpretation, identification, comprehension, calculation and application of basic concepts.
- 2.0 A research project using the basic principles of descriptive statistics and summary statistics that demonstrates an understanding of the nature of statistical knowledge; and will include graphical modes of

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interpretive presentation such as histograms, scatter plots, stem-and-leaf displays, or box-and-whisker plots.

- 3.0 A student presentation or other activity that illustrates the relationships between probability distributions, sampling distributions, counting techniques, and their applications in a variety of contexts;
- 4.0 Students must complete exams, quizzes, assignments, cooperative group work, lab work, and other authentic assessment measures. They must also attend class regularly and participate in classroom discussions.