



NASHUA COMMUNITY COLLEGE

COURSE OUTLINE FORM

Course Title: <i>Statistics I</i>			
Course Prefix & No.: <i>MATH106N</i>	Lecture Hours: 4	Lab Hours: 0	Credit Hours: 4
Department: <i>STEM</i>			
Program: <i>Mathematics</i>			

Prerequisites/ Co-requisites: (Explain the need for a prerequisite or a corequisite) See Appendix 3.

MATH099N is a prerequisite course. In order to perform the proper mathematical procedures necessary for statistics, it is imperative that students have mastery of basic algebra and arithmetic. In lieu of MATH099N, students who do not satisfactorily place into MATHN106N with the required Accuplacer or SAT scores will be required to enroll in the corresponding Co-Requisite Workshop.

Required Accuplacer Score: 80
Required Math SAT Score: 520

Entrance Skills: “Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed” Include reading, writing and computational skills as well as computer skills. Prior discipline knowledge should also be considered.

In order to be successful in this course, students must be able to perform accurate mathematics using methods from algebra and arithmetic, and be capable of reading and interpreting mathematical notation.

Catalog Description: Describe the course in a clear and succinct manner. Include the overall purpose of the course as well as the requirements. Explain how the course does or does not contribute to degree requirements. Developmental and ESL courses do not count towards degree requirements.

An introductory course in statistics concerned with the basic concepts involved in statistical analysis. Special emphasis is placed in an integrated coverage and presentation of descriptive an inductive statistical tools and techniques in support of meaningful decision making. Topics include: scales of measurement, random sampling, graphs and tables, measures of central tendency, probability and probability distributions, confidence intervals, error and sample size estimation, hypothesis testing, linear correlation, regression analysis and prediction. A Texas Instrument TI83 or TI84 graphing calculator is required. Prerequisite: Placement exam score or MATH099N. Students who do not satisfactorily place into MATHN106N with the required Accuplacer or SAT scores will be required to enroll in the corresponding Co-Requisite Workshop.

Course Competencies: Instructors will identify what is expected of students by developing learning competencies. Performance competencies focus on outcomes, results and learning. Objectives are preceded by the statement: “Students will be able to:”

There are not set number of objectives that are required. It is **suggested** that instructors use Bloom’s Taxonomy to structure a sequential approach to learning outcomes ranging from knowledge to critical thinking levels. See Appendix 1.

Competency (Knowledge and Skills)	Critical Thinking Skills
Students will be able to:	
- Explain how statistics can be properly used and misused	<i>Comprehension</i>
- Accurately interpret graphically expressed data	<i>Evaluation</i>
- Summarize descriptive data using various statistical measures.	<i>Comprehension</i>

- <i>Identify the degree of correlation between variables and perform linear regression analysis</i>	<i>Knowledge/Application</i>
- <i>Calculate mean and standard deviation under varied conditions</i>	<i>Comprehension</i>
- <i>Perform various methods of Hypothesis Testing</i>	<i>Application</i>
- <i>Apply the rules of probability</i>	<i>Application</i>
- <i>Solve various problems involving normally distributed data</i>	<i>Comprehension</i>
- <i>Explain how to apply the central limit theorem</i>	<i>Comprehension</i>
- <i>Infer how sample data can be used to obtain interval estimates</i>	<i>Comprehension</i>

Course Outline: The course outline will provide a general overview of the content that will be included in the course as they relate to the competencies. The first column lists the general content and the second column will allow for subtopics that will be covered.

Content Topic	Subtopics(a., b., etc.)
<i>Basic Statistical Content</i>	<ul style="list-style-type: none"> a. <i>Types of data</i> b. <i>Sampling Techniques</i> c. <i>Misuses of statistics</i> d. <i>Data Collection</i> e. <i>Interpretation of data presented graphically</i>
<i>Descriptive Statistics</i>	<ul style="list-style-type: none"> a. <i>Measures of Central Tendency</i> b. <i>Standard Deviation and Variance</i> c. <i>Exploratory Data Analysis</i>
<i>Probability</i>	<ul style="list-style-type: none"> a. <i>Independent and Dependent Events</i> b. <i>Addition and Multiplication Rules</i> c. <i>Combinations and Permutations</i>
<i>Discrete Probability Distributions</i>	<ul style="list-style-type: none"> a. <i>Expected Value</i> b. <i>Binomial Distribution</i>

<i>Normal Distribution and Confidence Intervals</i>	<ul style="list-style-type: none"> a. <i>Applications to the Normal Curve</i> b. <i>The Central Limit Theorem</i> c. <i>Confidence Intervals for the Mean</i> d. <i>Confidence Intervals for Proportions</i>
<i>Hypothesis Testing</i>	<ul style="list-style-type: none"> a. <i>z Test for Mean</i> b. <i>t Test for Mean</i> c. <i>z test for proportion</i>
<i>Correlation and Regression</i>	<ul style="list-style-type: none"> a. <i>Scatter Plots and Correlation</i> b. <i>Linear Regression</i>

Performance Evaluation: In this section please explain the different Assessment Tools that will be used to demonstrate student learning. The assessment ideally should include quantitative measures such as standardized tests, essays, locally-developed tests and if applicable, licensure exams. Qualitative measures such as portfolios of student work, written reports, oral presentations and interviews should be included as well.

<p>Formative Assessments</p> <p><i>Quizzes</i> <i>Homework Assignments</i> <i>Classroom Assignments</i></p>	<p>Summative Assessments</p> <p><i>Unit Exams</i> <i>Mid-term and Final Comprehensive Examinations</i></p>
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Method of Instruction: Examples include lecture, group discussion field trip, guest speakers, individual instruction, field observation, etc.

- *Lecture and discussion*
- *Readings*
- *Illustrations and Examples*
- *Classroom problem solving*
- *Assigned problems*

Instructional Facilities: List the type of classroom and any special facilities which may be required such as audiovisual, maps, lab facilities, etc.

Classroom with sufficient white board space and ENO board.

Revision History: Please include the dates of past revisions and if possible person(s) responsible for the revision.

Will this course be taught online? Yes No

If yes, please complete the Online Course Outline Form.

APPENDIX 1

Bloom's Taxonomy Action Verbs

Definitions	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Bloom's Definition	Remember previously learned information.	Demonstrate an understanding of the facts.	Apply knowledge to actual situations.	Break down objects or ideas into simpler parts and find evidence to support generalizations.	Compile component ideas into a new whole or propose alternative solutions.	Make and defend judgments based on internal evidence or external criteria.

Verbs						
	Arrange Define Describe Duplicate Identify Label List Match Memorize Name Order Outline Recognize Relate Recall Repeat Reproduce Select State	Classify Convert Defend Describe Discuss Distinguish Estimate Explain Express Extend Generalized Give example(s) Identify Indicate Infer Locate Paraphrase Predict Recognize Rewrite Review Select Summarize Translate	Apply Change Choose Compute Demonstrate Discover Dramatize Employ Illustrate Interpret Manipulate Modify Operate Practice Predict Prepare Produce Relate Schedule Show Sketch Solve Use Write	Analyze Appraise Breakdown Calculate Categorize Compare Contrast Criticize Diagram Differentiate Discriminate Distinguish Examine Experiment Identify Illustrate Infer Model Outline Point out Question Relate Select Separate Subdivide	Arrange Assemble Categorize Collect Combine Comply Compose Construct Create Design Develop Devise Explain Formulate Generate Plan Prepare Rearrange Reconstruct Relate Reorganize Revise Rewrite Set up Summarize Synthesize Tell Write	Appraise Argue Assess Attach Choose Compare Conclude Contrast Defend Describe Discriminate Estimate Evaluate Explain Judge Justify Interpret Relate Predict Rate Select Summarize Support Value

APPENDIX 2

1. Analyzing

- Separating or breaking a whole into parts to discover their nature, functional and relationships.
- "I studied it piece by piece"
- "I sorted things out"

2. Applying Standards

- Judging according to established personal, professional, or social rules or criteria.
- "I judged it according to..."

3. Discriminating

- Recognizing differences and similarities among things or situations and distinguishing carefully as to category or rank.
- "I rank ordered the various..."
- "I grouped things together"

4. Information Seeking

- Searching for evidence, facts, or knowledge by identifying relevant sources and gathering objective, subjective, historical, and current data from those sources
- "I knew I needed to lookup/study..."
- "I kept searching for data."

5. Logical Reasoning

- Drawing inferences or conclusions that are supported in or justified by evidence
- "I deduced from the information that..."
- "My rationale for the conclusion was..."

6. Predicting

- Envisioning a plan and its consequences
- "I envisioned the outcome would be..."
- "I was prepared for..."

7. Transforming Knowledge

- Changing or converting the condition, nature, form, or function of concepts among contexts
- "I improved on the basics by..."
- "I wondered if that would fit the situation of ..."

Courtesy of B. K. Scheffer and M.G. Rubenfeld, "A Consensus Statement on Critical Thinking in Nursing," *Journal of Nursing Education*, 39, 352-9 (2000).

Courtesy of B. K. Scheffer and M.G. Rubenfeld, "Critical Thinking: What Is It and How Do We Teach It?," *Current Issues in Nursing*, J.M. Grace, Rubl, H.K. (2001).

APPENDIX 3

Establishing Prerequisites and Corequisites*

A prerequisite or a corequisite must be carefully considered when added to a course. Some things to take into consideration when deciding on whether to add a prerequisite or corequisite are whether students have a history of requiring outside services such as tutoring, Accuplacer scores, previous success rates of students and

course completion rates. Prior discipline knowledge should also be considered. These conditions can be used to explain the need for a prerequisite or corequisite.

Prerequisites or corequisites may be established for any of the following purposes:

- a. An outside accrediting body expressly requires the prerequisite. This will be more likely in CTE programs.
- b. The prerequisite course will assure that the student has the skills, concepts, and/or information that is presupposed in terms of the course or program for which it is being established. A student who has not met the prerequisite is highly unlikely to receive a satisfactory grade in the course for which the prerequisite is being established.
- c. The corequisite course will assure that a student acquires the necessary skills, concepts and/or information. A student who does not take the corequisite is highly unlikely to receive a satisfactory grade in the class.

*Adapted from Guidelines for Title 5 Regulations Section 55003 Policies for Prerequisites, Corequisites and Advisories on Recommended Preparation