

# MATH 045: PRE-STATISTICS

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**Originator**

jlearned

**Co-Contributor(s)****Name(s)**

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**Justification / Rationale**

A course at the Intermediate Algebra level intended for preparation for Statistics or Liberal Arts Math.

**Effective Term**

Fall 2019

**Credit Status**

Credit - Degree Applicable

**Subject**

MATH - Mathematics

**Course Number**

045

**Full Course Title**

Pre-Statistics

**Short Title**

PRE-STATISTICS

**Discipline****Disciplines List**

Mathematics

**Modality**

Face-to-Face

**Catalog Description**

This course focuses on solving problems using linear, exponential, and other models with an introduction to the concept of a function. Topics include solving and graphing linear and exponential functions, systems of linear equations and inequalities, evaluating rational exponential functions, evaluating and solving root functions and equations, evaluating multivariate functions, creating and analyzing a variety of tables and diagrams, and applications to social sciences and financial mathematics. This course satisfies the Math Competency for an Associate Degree.

**Schedule Description**

This course covers linear, root, and exponential functions, systems of linear equations and inequality, rational exponents, and applications of these topics. Prerequisite: MATH 054 Advisory: ENG 061 & RDG 061

**Lecture Units**

3

**Lecture Semester Hours**

54

**Lab Units**

1

**Lab Semester Hours**

54

**In-class Hours**

108

**Out-of-class Hours**

108

**Total Course Units**

4

**Total Semester Hours**

216

**Prerequisite Course(s)**

MATH 054

Advisory: ENG 061 &amp; RDG 061

**Required Text and Other Instructional Materials****Resource Type**

Web/Other

**Open Educational Resource**

No

**Description**Pearson MyMathLab: <https://www.pearsonmylabandmastering.com/northamerica/>

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**Resource Type**

Book

**Open Educational Resource**

No

**Formatting Style**

APA

**Author**

Jay Lehmann

**Title**

A Pathway to Introductory Statistics

**Edition**

1

**City**

Boston

**Publisher**

Pearson

**Year**

2016

**College Level**

No

**Flesch-Kincaid Level**

8.3

**ISBN #**

9780134310046

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**Resource Type**

Web/Other

**Open Educational Resource**

No

**Description**Enhanced WebAssign: [www.webassign.net](http://www.webassign.net)

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**Resource Type**

Web/Other

**Open Educational Resource**

Yes

**Description**[www.MyOpenMath.com](http://www.MyOpenMath.com)

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**Resource Type**

Book

**Open Educational Resource**

Yes

**Formatting Style**

APA

**Author**

Lynn Marecek

**Title**

Intermediate Algebra

**Edition**

1

**City**

Houston

**Publisher**

OpenStax

**Year**

2017

**College Level**

No

**Flesch-Kincaid Level**

8.9

**ISBN #**

978-0-9986257-2-0

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**Class Size Maximum**

35

**Entrance Skills**

Know the Real Number System, including the following subsets of the Reals: integers, rationals, and irrationals.

**Prerequisite Course Objectives**

MATH 054-Identify, recognize and classify real numbers, as integers, rationals, or irrationals and locate their approximate positions on the real number line.

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**Entrance Skills**

Know and use the commutative, associative, distributive, identity, and inverse properties of the Real Numbers under the operations of addition and multiplication.

**Prerequisite Course Objectives**

MATH 054-Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions - perform arithmetic operations with algebraic expressions using the order of operations.

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**Entrance Skills**

Comprehend the concepts of variables and how variables can be used to represent unknown quantities.

**Prerequisite Course Objectives**

MATH 054-Understand the concepts of variables and how variables can be used to represent an unknown quantity or a range of quantities.

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**Entrance Skills**

Apply variables to create algebraic expressions that model an application problem.

**Prerequisite Course Objectives**

MATH 054-Use variables to create algebraic expressions that model quantities in an application problem.

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**Entrance Skills**

Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions - perform arithmetic operations with algebraic expressions using the order of operations.

**Prerequisite Course Objectives**

MATH 054-Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions - perform arithmetic operations with algebraic expressions using the order of operations.

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**Entrance Skills**

Apply variables with the algebraic method to create algebraic equations or inequalities that model an application problem

**Prerequisite Course Objectives**

MATH 054-Employ variables to create algebraic equations or inequalities that model an application problem.

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**Entrance Skills**

Add, subtract, multiply and divide polynomials.

**Prerequisite Course Objectives**

MATH 054-Add, subtract, multiply and divide polynomials.

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**Entrance Skills**

Apply the zero product principle to solve quadratic equations by factoring.

**Prerequisite Course Objectives**

MATH 054-Solve quadratic equations in one variable by factoring and applying the zero product property.

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**Entrance Skills**

Know square roots and solve square root equations

**Prerequisite Course Objectives**

MATH 054-Interpret square roots and solve square root equations.

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**Entrance Skills**

Know the Cartesian coordinate system and use it to graph linear equations by plotting points.

**Prerequisite Course Objectives**

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

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**Entrance Skills**

Demonstrate critical thinking skills when reading, composing and participating in class discussions.

**Prerequisite Course Objectives**

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.

RDG 061-Read a variety of texts fluently.

RDG 061-Write organized summaries reactions that capture main idea and supporting details.

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**Entrance Skills**

Know how to convert numbers from standard to scientific notation and vice versa. Be able to use scientific notation when evaluating expressions.

**Prerequisite Course Objectives**

MATH 054-Use the properties of integer exponents to simplify algebraic expressions, including expressions involving scientific notation.

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**Course Content**

- I. Functions
  1. Function Notation and Terminology
  2. Linear Functions
  3. Root Functions
  4. Exponential and Logarithmic Functions
  5. Bivariate and Multivariate Functions
- II. Introduction to Probability
  1. Combinations
  2. Permutations
  3. Computing Probabilities
- III. Radicals and Nth Roots
  1. Rational Exponents
  2. Properties of Exponents
  3. Root Equations
- IV. Summarizing Data
  1. Tables
  2. Charts
  3. Quantitative and Categorical Data
- V. Algebra
  1. Evaluating Expressions
  2. Solving Equations

**Lab Content**

- I. Data Analysis
  1. Creating Graphs
  2. Creating Tables

3. Creating Charts
  4. Measures of Center
  5. Measures of Spread
- II. Experiments
1. Mathematical Games Involving Probability
  2. Probability Experiments
- III. Problem solving
1. Guided Problem Solving
  2. Effective Quantitative Communication
  3. Presentation of Solutions

**Course Objectives**

	Objectives
Objective 1	Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.
Objective 2	Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
Objective 3	Create a linear model in the form of a table, graph, or equation, including a line of best fit for a set of given points.
Objective 4	Find the equation of a line and apply it to solve financial and social sciences problems involving constant rates of change.
Objective 5	Solve 2x2 and 3x3 systems of linear equations and solve application problems from social sciences.
Objective 6	Graph systems of linear inequalities in two dimensions and find the coordinates of points of intersection, including application problems similar to examples from linear programming.
Objective 7	Comprehend and manipulate rational exponents and Nth roots, including those used in financial mathematical formulas such as compound interest.
Objective 8	Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
Objective 9	Apply functions to topics from social sciences and consumer mathematics, including ceiling and floor functions.
Objective 10	Evaluate multivariate formulas useful in statistics and financial mathematics such as Max, Min, Arithmetic Mean, Median, Combinations, Permutations, and simple and compound interest formulas; know the mathematical and statistical symbols used in them; and become familiar with when each formula is applicable.
Objective 11	Evaluate root functions, including multivariate functions such as the standard deviation.
Objective 12	Comprehend that the key characteristic of an exponential function is its constant growth (or decay) factor and relate this to the differences between linear and exponential change with applications involving simple and compound interest.
Objective 13	Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function, including equations and graphs of functions similar to continuous probability distributions.
Objective 14	Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
Objective 15	Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
Objective 16	Create, manipulate, and analyze tables and charts including an introduction to writing basic formulas in spreadsheets, describing shapes of frequency distributions, reading histograms, and the advantages & disadvantages of a variety of diagrams such as Venn and Euler diagrams, pie/circle graphs, scatterplots, bar graphs, and time series.
Objective 17	Evaluate expressions using summation notation, including those requiring the use of the order of operations involving sums of many values.
Objective 18	Use the Fundamental Counting Principle, formulas such as those for counting combinations and permutations, binomial expansion, and Pascal's triangle to solve basic probability problems.

**Student Learning Outcomes**

<b>Upon satisfactory completion of this course, students will be able to:</b>	
Outcome 1	Combine reading comprehension, number sense, and algebraic skills to solve application problems from social sciences and financial mathematics.
Outcome 2	Create models using two or more variables to describe relationships between changing quantities or patterns in social sciences.
Outcome 3	Create, analyze, and interpret diagrams, such as graphs and scatterplots, and tables that represent phenomena from social sciences and financial mathematics.
Outcome 4	Use functions to represent relationships and use one form (an equation, a verbal description, a table, or a graph) to generate other forms.

**Methods of Instruction**

<b>Method</b>	<b>Please provide a description or examples of how each instructional method will be used in this course.</b>
Discussion	Discussion will be used to review, analyze, and evaluate various methods of solution.
Lecture	Lecture will be used for introduction and explanation of course topics.
Laboratory	Lab will be used, in groups or individually, for student exploration of the topics of the course.
Activity	Activities in the lab portion of the class will include performing probability experiments and using various tools for developing problem solving skills.

**Methods of Evaluation**

<b>Method</b>	<b>Please provide a description or examples of how each evaluation method will be used in this course.</b>	<b>Type of Assignment</b>
Written homework	Students will be evaluated by homework assignments covering topics from lecture. Students will typically be assigned 5-6 hours of homework per week.	Out of Class Only
Mid-term and final evaluations	Students will be evaluated by examinations involving problems that require the application of studied principles and skills to new situations as well as problems that mimic those done on homework and in class. The exam should consist of short answer or free response questions.	In Class Only
Mid-term and final evaluations	Students will be evaluated by a comprehensive two-hour final exam.	In Class Only
Computational/problem-solving evaluations	Students will be evaluated by completing challenging problem sets requiring careful reasoning and application of a variety of course topics.	In and Out of Class
Student participation/contribution	Students will be evaluated by their participation in lab activities and may be required to turn in write-ups of these activities.	In Class Only
Laboratory projects	Students will experiment with probability by playing games of chance. Students will be evaluated by their summary of the data gathered during the experiment and their analysis of the game using the laws of probability.	In Class Only
Self-paced testing, Student preparation	Students will be expected to read the textbook before coming to class as well as reviewing their notes after class. Students will be evaluated on their preparation and review by their performance on homework and exams. Students should typically spend an average of 1-2 hours per week on preparation and review.	Out of Class Only

**Assignments****Other In-class Assignments**

- a. Participate in classroom discussions to review, analyze, diagnose and evaluate various methods of solution used on their homework.
- b. Complete examinations involving problems that apply studied principles to new situations.

**Other Out-of-class Assignments**

- a. Read textbooks and supplementary assignments.
- b. Review notes
- c. Complete assigned homework including exercises designed to improve problem solving, computational skills and mathematical understanding.

**Grade Methods**

Letter Grade Only

**COD GE**

C4.B - Language and Rationality - Communication and Analytical Thinking

**MIS Course Data****CIP Code**

27.0101 - Mathematics, General.

**TOP Code**

170100 - Mathematics, General

**SAM Code**

E - Non-Occupational

**Basic Skills Status**

Not Basic Skills

**Prior College Level**

One level below transfer

**Cooperative Work Experience**

Not a Coop Course

**Course Classification Status**

Credit Course

**Approved Special Class**

Not special class

**Noncredit Category**

Not Applicable, Credit Course

**Funding Agency Category**

Not Applicable

**Program Status**

Program Applicable

**Transfer Status**

Not transferable

**Allow Audit**

Yes



**Repeatability**

No

**Materials Fee**

No

**Additional Fees?**

No

**Approvals****Curriculum Committee Approval Date**

11/15/2018

**Academic Senate Approval Date**

11/29/2018

**Board of Trustees Approval Date**

12/14/2018

**Chancellor's Office Approval Date**

1/7/2019

**Course Control Number**

CCC000599883