COLLEGE of the DESERT

MATH 045: PRE-STATISTICS

Originator

mflora

Justification / Rationale

Periodic update, add online modality, decrease class size to improve amount of attention to students (especially for lab activities)

Effective Term

Fall 2022

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
100% Online
Hybrid

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 & RDG 061

Required Text and Other Instructional Materials

Resource Type
Web/Other

Open Educational Resource
No

Description
Pearson MyMathLab: https://www.pearsonmylabandmastering.com/northamerica/ may be used with A Pathway to Introductory Statistics

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Resource Type
Book

Open Educational Resource
No

Formatting Style
APA

Author
Jay Lehmann

Title
A Pathway to Introductory Statistics

Edition
2

City
Boston

Publisher
Pearson

Year
2021

College Level
No

Flesch-Kincaid Level
8.3

ISBN #
9780134310046

Resource Type
Web/Other
Open Educational Resource
No

Description
Enhanced WebAssign: www.webassign.net may be used with the OpenStax textbook

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Resource Type
Web/Other
Open Educational Resource
Yes

Description
www.MyOpenMath.com may be used with any textbook

Resource Type
Book
Open Educational Resource
Yes

Formatting Style
APA

Author
Lynn Marecek, Andrea Honeycutt Mathis

Title
Intermediate Algebra

Edition
2

City
Houston

Publisher
OpenStax

Year
2020

College Level
No

Flesch-Kincaid Level
8.9

ISBN #
978-0-9986257-2-0

Resource Type
Book
Open Educational Resource
No

Author
D. Franklin Wright

Title
Pathways to College Mathematics + Guided Notebook + HawkesLearning Courseware

Edition
1

Publisher
Hawkes Learning

Year
2021

College Level
No

ISBN #
978-1-64277-121-3

Class Size Maximum
30

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

Requisite 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.

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

Requisite 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.

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

Requisite 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.

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

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

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.

Requisite 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.

Entrance Skills

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

Requisite Course Objectives

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

Entrance Skills

Add, subtract, multiply and divide polynomials.

Requisite Course Objectives

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

Entrance Skills

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

Requisite Course Objectives

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

Entrance Skills

Know square roots and solve square root equations

Requisite Course Objectives

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

Entrance Skills

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

Requisite 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.

Entrance Skills

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

Requisite 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.

Entrance Skills

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

Requisite Course Objectives

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

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	Categorize functions as linear by recognizing that the key characteristic of a linear model is its constant rate of change, interpret slope as a rate of change, and relate slope to topics from social sciences.
Objective 2	Characterize a table, graph, or equation as linear or nonlinear and predict when a scatterplot exhibits linear correlation.
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	Evaluate and manipulate rational exponents and Nth roots, including those used in financial mathematical formulas such as compound interest.
Objective 8	Describe the definition of a function and employ 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	Characterize an exponential function as a model with a constant growth (or decay) factor and contrast this to the the constant rate of change of a linear model.
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	Describe one-to-one and inverse functions, including logarithmic functions, and employ 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.
Objective 19	Contrast correlation and causation in written form.
Objective 20	Contrast simple and compound interest.

Student Learning Outcomes

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

Method	Please provide a description or examples of how each instructional method will be used in this course.
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 induvidually, 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

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
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. Exams may have take-home components.	In and Out of Class
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	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, 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, watch videos, and complete other supplementary research 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

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

100

On-campus %

0

What will you be doing in the face-to-face sections of your course that necessitates a hybrid delivery vs a fully online delivery?

Although the course can be offered entirely online, it may also be offered hybrid to take advantage of collaboration activities that are more suited to in-person interaction.
Examinations can be given in a controlled location.

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

Lab assignments involve more interaction. For example, they may require students collaborate with a classmate, utilize a tutoring resource, or interview someone who is not part of the course.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

Lab activities are discussions and assignments that involve solving problems or exploring concepts with other students, with people not part of the course, or under the guidance of the professor or instructional support assistant. Discussions and other assignments that are completed in Canvas are monitored and evaluated by the professor. Assignments that do not take place in Canvas are evaluated by the professor based on write-ups (which may include summaries and feedback from the participants). Anonymous and non-anonymous feedback opportunities will be available to students to allow the professor further monitor effectiveness and appropriateness of activities that take place somewhere other than on the course LMS.

How will you assess the online delivery of lab activities?

Reports and other forms of write-ups will be submitted on the course LMS for evaluation and feedback.

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

Depending on the textbook used, the professor may choose to use Pearson MyLab and Mastering, Hawkes Learning, WebAssign or MyOpenMath. All of these are considered to be safe for use in education for both faculty and students. All can also be integrated with the college LMS (Canvas), which decreases the amount of times students will need to sign-in-and-out of accounts and open them up to data breaches.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

Professors who choose to use Pearson MyLab and Mastering, WebAssign, Hawkes Learning, or MyOpenMath do so in order to assign pre-written or instructor- created problems that are more complicated than those that can be created in Canvas while still receiving instantaneous feedback.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Discussion forums with substantive instructor participation
Online quizzes and examinations
Private messages
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Weekly announcements

External to Course Management System:

Direct e-mail
Posted audio/video (including YouTube, 3cmediasolutions, etc.)
Synchronous audio/video
Telephone contact/voicemail

For hybrid courses:

Scheduled Face-to-Face group or individual meetings

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Faculty will regularly contact students individually and as a group through Canvas messages and/or COD email. Students will also receive regular announcements with information about the course, COD as a whole, or other relevant information.
In discussions and through other lab assignments, students will communicate with each other and their professor regularly and frequently.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Students may prefer to contact their professor via email or on the phone, which allows for an improved experience for those who communicate better in those contexts. The professor may direct students to access free supplemental resources as well.

Other Information

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

General Education Status
C = Non Transferable-Local GE for Analytical Thinking or Math Competency

Support Course Status
N = Course is not a support course

Allow Audit
Yes

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
11/18/2021

Academic Senate Approval Date
12/09/2021

Board of Trustees Approval Date
01/22/2022

Chancellor's Office Approval Date
03/11/2022

Course Control Number
CCC000599883

Programs referencing this course
Registered Nursing AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=72)