ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences and Business

COURSE: ECN 2004 Business Statistics

Date: Fall 2022

Credit Hours: 3

Complete all that apply or mark "None" where appropriate:
  Prerequisite(s): MTH 0910 with a grade of C or better

  Enrollment by assessment or other measure? ☒ Yes ☐ No
  If yes, please describe: by appropriate assessment

  Corequisite(s): None

  Pre- or Corequiste(s): None

  Consent of Instructor: ☐ Yes ☒ No

Delivery Method: ☒ **Lecture**   **3 Contact Hours** (1 contact = 1 credit hour)
                   ☐ **Seminar**   **0 Contact Hours** (1 contact = 1 credit hour)
                   ☐ **Lab**   **0 Contact Hours** (2-3 contact = 1 credit hour)
                   ☐ **Clinical**   **0 Contact Hours** (3 contact = 1 credit hour)
                   ☐ **Online**
                   ☐ **Blended**
                   ☐ **Virtual Class Meeting (VCM)**

Offered: ☒ **Fall**   ☒ **Spring**   ☒ **Summer**

CATALOG DESCRIPTION and IAI NUMBER (if applicable):
This course will provide an introduction to descriptive statistics and statistical inference as employed in business decision-making. Emphasis is on measures of central tendency and dispersion, frequency distribution, probability, hypothesis testing, estimation, statistical inference, simple linear regression, correlation and multiple linear regression.

ACCREDITATION STATEMENTS AND COURSE NOTES:
None

COURSE TOPICS AND CONTENT REQUIREMENTS:
Competency 1: Students will be able:
1.1   To show the difference between samples and populations
1.2   To convert raw data to useful information
1.3   To construct and use data arrays
1.4   To construct and use frequency distributions
1.5   To graph frequency distributions with histograms, polygons, and ogives
1.6   To use frequency distributions to make decisions

Competency 2: Students will be able:
2.1   To use summary statistics to describe collections of data
2.2   To use the mean, median, and mode to describe how data "bunch up"
2.3   To use the range, variance, and standard deviation to describe how data "spread out"

Competency 3: Students will be able:
3.1   To examine the use of probability theory in decision making
3.2   To explain the different ways probabilities arise
3.3   To develop rules for calculating different kinds of probabilities
3.4   To use probabilities to take new information into account: the definition and use of Bayes theorem.

Competency 4: Students will be able:
4.1   To introduce the probability distributions most commonly used in decision making, such as the binomial, normal and Possin distibutions.
4.2   To use the concept of expected value to make decisions
4.3   To show which probability distribution to use and how to find its value
4.4   To understand the limitations of each of the probability distributions you use

Competency 5: Students will be able:
5.1   To take a sample from an entire population and use it to describe the population
5.2   To make sure samples you do take are an accurate representation of the population from which they came
5.3   To introduce the concepts of sampling distributions
5.4   To understand trade-offs between the cost of taking larger samples and the additional accuracy this gives to decisions made from them
5.5   To introduce experimental design: sampling procedures to gather the most information for the least cost

Competency 6: Students will be able:
6.1   To learn how to estimate certain characteristics of a population from samples
6.2   To learn the strengths and shortcomings of point estimates and interval estimates
6.3   To calculate how accurate our estimates really are
6.4   To learn how to use t distribution interval estimates in some cases when the normal distribution cannot be used

6.5	To calculate the sample size required for any desired level of precision in estimation

Competency 7: Students will be able:
7.1	To learn to use samples to decide whether a population possesses a particular characteristic
7.2	To determine how unlikely it is that an observed sample could have come from a hypothesized population
7.3	To understand the two types of errors possible when testing hypotheses
7.4	To learn when to use one-tailed test
7.5	To learn the five-step process for testing hypotheses
7.6	To understand how and when to use the normal and t distributions for testing hypotheses about population means and proportions

Competency 8: Students will be able:
8.1	To learn how to use samples from two populations to test hypotheses of the populations are related
8.2	To learn how hypothesis tests for differences between population means take different forms, depending on whether the samples are large or small
8.3	To conduct a Chi-square test
8.4	To distinguish between independent and dependent samples when comparing means
8.5	To learn how to reduce a hypotheses test for the difference of means from dependent samples to test about a single mean
8.6	To learn how to test hypothesis that compare the proportions of two populations having the same attribute of interest.
8.7	To understand how prob values can be used in testing hypotheses
8.8	To get a feel for the kinds of outputs from computer statistical packages produce for testing hypotheses

Competency 9: Students will be able:
9.1	To perform a one way analysis of variance test
9.2	To identify and understand positive and negative correlation
9.3	To understand the basics of linear regression

INSTRUCTIONAL METHODS:
Lecture
Written assignments
Class discussions
Exams
Videos
Discussion of the Applications of Business Statistics in the real world

EVALUATION OF STUDENT ACHIEVEMENT:
Regular class attendance.
Active participation in class discussions
Exams
Completion of assigned work

INSTRUCTIONAL MATERIALS:
Textbooks
Business Statistics: A First Course, 8th edition, Pearson Prentice Hall publishing, by
   Levine, Krehbiel and Berenson

Resources
Powerpoints
Exams
Videos

LEARNING OUTCOMES AND GOALS:
Institutional Learning Outcomes
☐ 1) Communication – to communicate effectively;
☒ 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical
   reasoning to formulate a judgement or conclusion;
☐ 3) Social Consciousness – to understand what it means to be a socially conscious
   person, locally and globally;
☐ 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies
Upon completion of the course, the student will be able to:
1. Develop skills to identify the appropriate statistical technique for the analysis of data.
2. Learn how to interpret and present data for people without a statistics background.
3. Understand statistical techniques such as F tests, t tests, correlation, simple and
   multiple regression