SAGRADO
Universidad del Sagrado Corazón

SYLLABUS

TITLE: Statistical Analysis

CODE: MCO 250

PREREQUISITE: N/A

CREDITS: 3 credits | 45 contact hours | 1 term

DESCRIPTION

Introduction to descriptive statistics and the theory of probability applied to problem solving. Study of the techniques of the graph presentation, description of data, frequency distributions, measurements of position, and dispersion for data. Study of the concept of probability, from the quantitative and qualitative aspect. Presentation and use of probability distributions. Study of the impact of ethics on statistical analysis. Uses Excel as a tool for procedures.

JUSTIFICATION

The manager is faced with a large amount of information that must be interpreted, analyzed, and disseminated in order to make decisions. This course offers students skills in the interpretation and use of quantitative information applied to decision-making and problem-solving in different professional areas.

COMPETENCES

The course develops the following competences in students:

- **Ethical sense and social justice**
- **Communication**

OBJECTIVES

After completion of the course, students will be able to:

1. Develop data analysis skills.
2. Use statistics as a communication tool necessary for decision making.

3. Apply statistics to solve problems in various professional fields using technological tools.
4. Recognize the importance of ethics in the handling of statistical data.
5. Interpret and analyze information using tabulation, graphic representation, and description techniques.
6. Apply the principles of discrete and/or continuous distributions in problem solving.
7. Solve simple decisional problems under conditions of uncertainty.

CONTENTS

I. Definitions and Basic Concepts of Statistics
   A. Importance of statistics in the profession
   B. Descriptive statistics
   C. Inferential statistics
   D. Estimate versus parameter
   E. Others

II. Descriptive Statistics
   A. Data management
   B. Constructing frequency distributions with grouped and ungrouped data
      1. Absolute frequency distribution
      2. Relative frequency distribution
   C. Graphical representation of frequency distributions and their interpretation
      1. Dispersion graphs
      2. Pie charts
      3. Histogram
      4. Frequency polygons and ogives
   D. Ethical handling of data, information, and inferences

III. Measures of Central Tendency and Dispersion
   1. Calculating central tendency measures for grouped and ungrouped data
      1. Mode
      2. Median
      3. Arithmetic mean (average) of the population and sample
         a. Advantages and disadvantages of the arithmetic mean

b. Weighted arithmetic mean (average)

B. Calculation of dispersion measurements
   1. Route or range
   2. Percentiles, deciles, quartiles
   3. Variance and standard deviation of the population and sample
   4. Relevance of dispersion measures to estimate risk and uncertainty
   5. Relative dispersion - coefficient of variation

IV. Introduction to Probabilistic Theory

A. Terminology
   1. Events
      a. Mutually exclusive events
      b. Collectively exhaustive events
   2. Sample space
   3. Experiments and results
   4. Counting rules
      a. Permutations
      b. Combinations
      c. MN rule

B. Types of probability
   1. Classic definition
   2. Subjective probability

C. Rules of probability
   1. Sum of mutually exclusive events
   2. Sum of non-mutually exclusive events
   3. Others

D. Probability under conditions of statistical independence
   1. Marginal probability
   2. Joint probability
   3. Conditional probability

E. Probability under statistical dependence conditions
   1. Marginal probability
   2. Joint probability
   3. Conditional probability

F. Bayes' Theorem

V. Probability models and distributions
   A. Probability functions and discrete random variables
   B. Expected values and variance
   C. Probability distributions
      1. Probability distribution for discrete variables (binomial)
      2. Probability distribution for continuous variables (normal distribution)

VI. Sampling
   A. Simple random sampling
   B. Systematic sampling
   C. Stratified sampling
   D. Cluster sampling

METHODOLOGY

The following strategies from the active learning methodology are recommended:

- Conferences
- Video conferences
- Cases discussion
- Problem solving using statistic tools
- Team and project works

EVALUATION

Two partial exams	40%
Exercises/projects	40%
Final exam	20%
Total	100%

LEARNING ASSESSMENT

The institutional assessment rubric is applied to the course's core activity.

BIBLIOGRAPHY

TEXTBOOK

Levine, D. M., Stephan, D. F., & Szabet, K.A. (2017). *Statistics for managers using Microsoft Excel* (8th ed.). Pearson Education.

REFERENCES

Anderson, D. R., Sweeney, D. J., & Williams, T. A. (2010). *Statistics for business and economics* (11th ed.). South-Western Cengage Learning.

Bluman, A. G. (2017). *Elementary statistics: A step by step approach* (10th ed.). McGraw-Hill.

Healey, J. F. (2014). *Statistics: A tool for social research* (10th ed.). Wadsworth Publishing.

Krantz, L., Smith, C. (2011). *The unofficial U.S. census: Things the official U.S. census doesn't tell you about America.* Skyhorse Publishing.

Larson, R., Farber, B. (2014). *Elementary statistics: Picturing the world* (6th ed.). Pearson Prentice Hall.

Levine, D. M. (2008). *Statistics for managers using Microsoft Excel* (5th ed.). Pearson.

McClave, J. T., Benson, P. G., & Sincich, T. (2012). *Statistics for business and economics* (12th ed.). Pearson Education Limited.

Moore, D. S. (2009). *The practice of business statistics: Using data for decisions* (2nd ed.). W.H. Freeman.

Posada Hernández, G.J. (n.d.). *Elementos básicos de estadística descriptiva para el análisis de datos*. Fundación Editorial Luis Amigó.

Salkind, N. J. (2017). *Statistics for people who (think they) hate statistics: Excel 2016*

edition (4th ed.). Sage Publications.

ELECTRONIC RESOURCES

http://www.amstat.org/publications/jse/information.html
http://www.dartmouth.edu/~chance/
http://www.geocities.com/ResearchTriangle/System/3737/
http://stats.bls.gov/
http://www.census.gov/#
http://www.estadisticas.gobierno.pr/iepr/
http://www.learner.org/exhibits/statistics/
http://www.matstat.com/teach/
http://www.uvm.edu/~dhowell/StatPages/StatHomePage.html

For more information resources related to the course's topics, access the library's webpage http://biblioteca.sagrado.edu/

REASONABLE ACCOMMODATION

For detailed information on the process and required documentation you should visit the corresponding office. To ensure equal conditions, in compliance with the ADA Act (1990) and the Rehabilitation Act (1973), as amended, any student in need of reasonable accommodation or special assistance must complete the process established by the Vice Presidency for Academic Affairs.

ACADEMIC INTEGRITY

This policy applies to all students enrolled at Universidad del Sagrado Corazón to take courses with or without academic credit. A lack of academic integrity is any act or omission that does not demonstrate the honesty, transparency, and responsibility that should characterize all academic activity. Any student who fails to comply with the Honesty, Fraud, and Plagiarism Policy is exposed to the following sanctions: receive a grade of zero in the evaluation and / or repetition of the assignment in the seminar, a grade of F (*) in the seminar, suspension, or expulsion as established in the Academic Integrity Policy effective in November 2022.