SAGRADO
Universidad del Sagrado Corazón

SCHOOL OF HEALTH AND SCIENCES

SYLLABUS

TITLE: Applied Statistics

CODE: MAT 210

CREDITS: 3 credits | 45 contact hours | 1 term

DESCRIPTION

MAT 210 is a descriptive statistics course that includes the study of frequency distributions and their graph representations through: histograms, pie charts, line charts, ogives, bar charts, and stem and leaf diagrams. Data is analyzed through ratios, proportions, percentage change, and rates. Study of measures of central tendency (mode, mean, and median) and measures of dispersion (scope, variance, and standard deviation). Normal distribution and interpretation of Z-values. The concept of correlation and simple linear regression and sampling is studied. The application of ethics is integrated into the work of statistics

JUSTIFICATION

Statistical knowledge is imperative for understanding studies carried out in most fields, everyone should be a good consumer of statistics. People who decide to pursue graduate studies will, in all likelihood, need mastery of statistics to be able to carry out their research efficiently.

The course is designed for students who do not come from quantitative areas and is developed using applications from the disciplines of Education, Communication, and Social Sciences.

COMPETENCES

The course develops the following competences in students:

- **Communication**
- **Critical questioning**
- **Research and exploration**

OBJECTIVES

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

1. Develop data analysis and interpretation skills.
2. Use statistics as a communication tool.
3. Use statistics to solve problems.
4. Incorporate statistics into the research process.
5. Develop an appreciation of the ethical value of statistics.
6. Use programs (Word, Excel, SPSS) to complete statistical analyses.

CONTENTS

I. Basic Definitions
   A. Statistics
      1. Descriptive
      2. Inferential
      3. Data
      4. Population
      5. Parameter
      6. Sample
   B. Variables
      1. Discreet
      2. Continuous
   C. Classes
   D. Scales
      1. Nominal
      2. Ordinal
      3. Interval

II. Basic Mathematics Check
   A. Operations with:
      1. Decimals
      2. Fractions
      3. Negative and positive numbers
   B. PEMDAS
   C. Exponents

D. Rounding Rules
E. Scientific Notation
F. Square Root

III. Relationships Between Quantities for Interpreting Data
A. Ratios
B. Proportions
C. Rate

IV. Data Organization:
A. Frequency tables
1. Stem & leaf
B. Graph representations
1. Histograms
2. Frequency polygons
3. Pie chart
4. Misleading graphics

V. Measures of Central Tendency and Dispersion
A. Mean, median, and mode for unclustered and pooled data.
B. Variance and standard deviation for unclustered and clustered data.
C. Coefficient of variation
1. Calculate coefficient of variation to determine if the data are homogeneous or heterogeneous.

VI. The Normal Distribution Curve: Theory and Analysis
A. Z-Scores and the Normal Curve
1. Handling the z-score table
2. How to switch to z-score
3. Probability: calculate area under the curve
B. Applications of the normal curve and areas under the curve
C. Probabilities using z-scores

VII. Correlation and Prediction
A. Basic concepts of correlation
B. Independent and dependent variables
C. Graphical representation of the correlation
D. Correlation indices

1. Pearson linear correlation and its significance

VIII. Odds and Prediction

A. Appreciation of probabilities and prediction.

B. General concepts and mathematics of probabilities and prediction

1. Playing with cards and dice to understand mathematical concepts

INSTRUCTIONAL STRATEGIES

The course is offered in a computer lab where students can immediately put into practice the concepts learned by using the computer to do the statistical analysis. In addition to lectures, presentations, and discussion of exercises, student participation is stimulated through the assignment of exercises in the classroom and the development of a research project. The instructional strategy is oriented towards the solution of social problems by collecting, organizing, and analyzing results.

EVALUATION

Participation	15%
Composition	20%
Partial assignments	40%
Final evaluation	25%
Total	**100%**

LEARNING ASSESSMENT

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

BIBLIOGRAPHY

TEXTBOOK

Bluman, A. (2001). *Elementary statistics: A step by step approach* (6th ed.). McGraw Hill. [Excel Handbook for Statistical Troubleshooting.]

REFERENCES

Aron, A., Aron, E. (2010). *Statistics for behavioral and social sciences* (5th ed.). Prentice Hall.

Ivars, A., García J., & Bachero, J. (2005). *Estadística descriptiva y nociones de probabilidad*. Aula Magna.

Sánchez J. (1994). *Fundamentos del razonamiento estadístico* (2nd ed.). Centro Caribeño de Estudios Postgraduados.

Sirkin, M. (2005). *Statistics for the social sciences* (3rd ed.). Sage Publisher.

ELECTRONIC REFERENCES

Methods of Basic Statistics. http://web.cortland.edu/flteach/stats/stat-sp.html

Understanding and Using Statistics. http://www.cortland.edu/flteach/stats/stat-sp.html

Basic Statistics eBook. http://www.statsoft.com/textbook/stathome.html

Hyperstar Online Textbook. http://davidmlane.com/hyperstat/

Basic Statistics Tutorial.
http://escuela.med.puc.cl/paginas/Postgrado/DiplomaAdminis/Estadistica

Research Work Planning. http://www.monografias.com/trabajos10/planific/planific.shtml

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 Student Affairs.

- Students participating in the Student Support Program (PAE, in Spanish) shall request their reasonable accommodation in PAE's offices.
- Students who do not participate in PAE shall request their reasonable accommodation at the Integral Wellness Center (*Centro de Bienestar Integral*, in Spanish).

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.

RESEARCH COURSES

This course may require students to practice tasks related to the research process, such as taking informed consent or assent, administering instruments, conducting interviews, observations, or focus groups, among others. These assignments are part of an academic exercise and the information collected will not be used to share with third parties or disclose it in settings other than the classroom with the professor teaching the course. Every student, as well as their professor, who will interact with human subjects as part of their research practice must be certified in ethics with human subjects in research by the Collaborative Institutional Training Initiative (CITI Program).