



Peruvian Computing Society (SPC)  
School of Computer Science  
Syllabus 2022-I

**1. COURSE**

MA203. Statistics and Probabilities (Mandatory)

**2. GENERAL INFORMATION**

- 2.1 Credits : 4  
2.2 Theory Hours : 2 (Weekly)  
2.3 Practice Hours : 2 (Weekly)  
2.4 Duration of the period : 16 weeks  
2.5 Type of course : Mandatory  
2.6 Modality : Face to face  
2.7 Prerequisites : MA100. Mathematics I. (1<sup>st</sup> Sem)

**3. PROFESSORS**

Meetings after coordination with the professor

**4. INTRODUCTION TO THE COURSE**

It provides an introduction to probability theory and statistical inference with applications, needs in data analysis, design of random models and decision making.

**5. GOALS**

- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to identify, formulate, and solve real problems.

**6. COMPETENCES**

- a) An ability to apply knowledge of mathematics, science. (**Usage**)
- j) Apply the mathematical basis, principles of algorithms and the theory of Computer Science in the modeling and design of computational systems in such a way as to demonstrate understanding of the equilibrium points involved in the chosen option. (**Usage**)

**7. SPECIFIC COMPETENCES**

- a37)** Calculate position (mean, median, mode) and dispersion (standard deviation, range, interquartile range) descriptors of observations of a random variable.
- a38)** Use position (mean, median, mode) and dispersion (standard deviation, range, interquartile range) descriptors to make decisions on real problems such as determining the average gain or warranty period of a product.
- a39)** Visualize (histograms, boxplot and scatter plot) a set of observations of a random variable to understand its behavior
- j9)** Use linear algebra to determine the coefficients in a multiple regression model to explain a random variable as a function of others
- j10)** Perform residue analysis of a regression to validate a regression model and establish the statistical significance of its coefficients.

**8. TOPICS**

<b>Unit 1: Variable Type (6)</b>	
<b>Competences Expected: C1</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Variable Type: Continuous, discrete</li> </ul>	<ul style="list-style-type: none"> <li>• Classify the relevant variables identified according to their type: continuous (interval and ratio), categorical (nominal, ordinal, dichotomous).</li> <li>• Identify the relevant variables of a system using a process approach.</li> </ul>
<b>Readings :</b> [MRo14], [Men14]	

<b>Unit 2: Descriptive Statistics (6)</b>	
<b>Competences Expected: C1</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Central Tendency (Mean, median, mode)</li> <li>• Dispersion (Range, standard deviation, quartile)</li> <li>• Graphics: histogram, boxplot, etc.: Communication ability.</li> </ul>	<ul style="list-style-type: none"> <li>• Use central tendency measures and dispersion measures to describe the data gathered.</li> <li>• Use graphics to communicate the characteristics of the data gathered.</li> </ul>
<b>Readings :</b> [MRo14], [Men14]	

<b>Unit 3: Inferential Statistics (6)</b>	
<b>Competences Expected: CS2</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Determination of the sample size</li> <li>• Confidence interval</li> <li>• Type I and type II error</li> <li>• Distribution type</li> <li>• Hypothesis test (t-student, means, proportions and ANOVA)</li> <li>• Relationships between variables: correlation, regression.</li> </ul>	<ul style="list-style-type: none"> <li>• Propose questions and hypotheses of interest.</li> <li>• Analyze the data gathered using different statistical tools to answer questions of interest.</li> <li>• Draw conclusions based on the analysis performed.</li> </ul>
<b>Readings :</b> [MRo14], [Men14]	

## 9. WORKPLAN

### 9.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

### 9.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

### 9.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

## 10. EVALUATION SYSTEM

\*\*\*\*\* EVALUATION MISSING \*\*\*\*\*

## 11. BASIC BIBLIOGRAPHY

- [Men14] Beaver Mendenhall. *Introducción a la probabilidad y estadística*. 13th. Cengage Learning, 2014.
- [MRo14] Sheldon M.Ross. *Introduction to Probability and Statistics for Engineers and Scientists*. 5th. Academic Press, 2014.