

## 1. COURSE

MA203. Statistics and Probabilities (Mandatory)

## 2. GENERAL INFORMATION

- 2.1 Course : MA203. Statistics and Probabilities  
 2.2 Semester : 4<sup>to</sup> Semestre.  
 2.3 Credits : 3  
 2.4 Horas : 2 HT; 2 HP;
- 2.5 Duration of the period : 16 weeks  
 2.6 Type of course : Mandatory  
 2.7 Learning modality : Face to face  
 2.8 Prerequisites : MA101. Calculus. (2<sup>nd</sup> Sem) MA101. Calculus. (2<sup>nd</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

- 1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. (**Assessment**)
- 6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (**Assessment**)

## 7. TOPICS

Unit 1: Variable Type (6)	
Competences Expected:	
Topics	Learning Outcomes
<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>
Readings : [MRo14], [Men14]	

Unit 2: Descriptive Statistics (6)	
Competences Expected:	
Topics	Learning Outcomes
<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>
Readings : [MRo14], [Men14]	

Unit 3: Inferential Statistics (6)	
Competences Expected:	
Topics	Learning Outcomes
<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>
Readings : [MRo14], [Men14]	

## 8. WORKPLAN

### 8.1 Methodology

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

### 8.2 Theory Sessions

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

### 8.3 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.

## 9. EVALUATION SYSTEM

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

## 10. BASIC BIBLIOGRAPHY

[Men14] Beaver Mendenhall. *Introducción a la probabilidad y estadística*. 13th. 2014.

[MRo14] Sheldon M.Ross. *Introduction to Probability and Statistics for Engineers and Scientists*. 5th. 2014.