SOCIEDAD PERUANA DE COMPUTACIÓN

Peruvian Computing Society (SPC)
School of Computer Science
Sillabus 2021-I

1. COURSE

MA308. Exploratory Spatial Data Analysis (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 Prerrequisites	:	MA203. Statistics and Probabilities. (4^{th} Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

Provee de una introducción a la teoría de las probabilidades e inferencia estadistica con aplicaciones, necesarias en el análisis de datos, diseño de modelos aleatorios y toma de decisiones.

5. GOALS

- That the student learns to use the tools of statistics to make decisions in situations of uncertainty.
- That the student learns to draw conclusions from experimental data.
- The student will be able to extract useful conclusions about a whole population based on collected information.

6. COMPETENCES

a) An ability to apply knowledge of mathematics, science. (**Usage**)

i) An ability to use the techniques, skills, and modern computing tools necessary for computing practice. (**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. (**Assessment**)

7. SPECIFIC COMPETENCES

■NoSpecificOutcomes■

8. TOPICS

Unit 1: (6)	
Competences Expected: C1	
Topics	**Learning Outcomes**
• Data presentation. • Central location measurements. • Dispersion measures.	• Present summary and description of data. [Usage]
Readings : [Wil97]	

Unit 2: (6)	
Competences Expected: C1	
Topics	**Learning Outcomes**
• Sample spaces and events. • Axioms and probability properties. • Conditional probability. • Independence. • Bayes' Theorem.	• Identify random spaces. [Usage] • design probabilistic models. [Usage] • Identify events as a result of a random experiment. [Usage] • Calculate the probability of occurrence of an event. [Usage] • Find the probability using conditionality, independence and Bayes. [Usage]
Readings : [Mey70]	

Unit 3: (6)	
Competences Expected: CS6	
Topics	**Learning Outcomes**
• Definition and types of random variables. • Distribution of probabilities. • Density functions. • Expected value. • Moments.	• Identify random variables that describe a sample space. [Usage] • Build the density distribution or function. [Usage] • Characterize joint density distributions or functions. [Usage]
Readings : [Mey70], [Dev98]	

Unit 4: (6)	
Competences Expected: CS6	
Topics	**Learning Outcomes**
• Basic probability distributions. • Basic Probability Densities. • Random variable functions.	• Calculate probability of a random variable with distribution or density function. [Usage] • Identify the density distribution or function that describes a random problem. [Usage] • Testing distribution properties or density functions. [Usage]
Readings : [Mey70], [Dev98]	

Unit 5: (6)	
Competences Expected: CS2	
Topics	**Learning Outcomes**
• Random variables distributed together. • Expected values, covariance and correlation. • The statistics and their distributions. • Distribution of sample averages. • Distribution of a linear combination.	• Find the joint distribution of two discrete or continuous random variables. [Usage] • Find the marginal or conditional distributions of joint random variables. [Usage] • Determine dependence or independence of random variables. [Usage] • Proving properties that are a consequence of the Central Limit Theorem. [Usage]
Readings : [Mey70], [Dev98]	

Unit 6: (6)	
Competences Expected: CS2	
Topics	**Learning Outcomes**
• Statistical estimation • Hypothesis testing • Hypothesis testing using ANOVA	• Test whether an estimator is unbiased, consistent, or sufficient. [Usage] • Find confidence intervals to estimate parameters. [Usage] • Make parameter decisions based on hypothesis testing. [Usage] • Test hypotheses using ANOVA. [Usage]
Readings : [Mey70], [Dev98]	

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

[Dev98] Jay L. Devore. *Probabilidad y estadística para ingeniería y ciencias*. International Thomson Editores, 1998. ISBN: 968-7529-48-2.

[Mey70] Paul L Meyer. *Introductory Probability and Statistical Applications*. Addison Wesley, 1970. ISBN: 0201047101.

[Wil97] Terry Sincich William Mendenhall. *Probabilidad y Estadística para Ingenerías Ciencias*. Prentice Hall Hispanoamericano, S.A., 1997. ISBN: 968-880-960-8.