SUBJECT SYLLABUS
ACADEMIC OVERVIEW
INTERNATIONAL SCHOOL OF ECONOMIC & ADMINISTRATIVE SCIENCES

COURSE NAME AND CODE: **Probability & Statistics II (21402)**

PROGRAM:

Bachelor of Business Administration (BBA)

Bachelor of International Marketing & Logistics Administration (BIMLA)

Bachelor of Economics & International Finance (EIF)

LEVEL OF STUDY: **Undergraduate Programme**

GENERAL ACADEMIC INFORMATION					
LATEST UPDATE	2020-2				
ACADEMIC DEPARTMENT	Mathematics & Statistics				
SUBJECT TYPE	Mandatory				
LANGUAGE	Spanish				
SEMESTER	Programme	Semester			
	BBA	5			
	BIMLA	5			
	EIF	4			
NUMBER OF ACADEMIC CREDITS	3				
HOURS OF ACADEMIC WORK	144	**Contact hours**	64	**Hours of independent/autonomous work**	80

LEARNING PREREQUISITES	• Understand the concept of a defined integral as the approximation of the area under the graph of a curve • Use integration techniques to solve application problems • Classify sets of data differentiating characteristics that identify types of variables • Represent sets of data which have the same characteristics through tables and graphs • Describe and interpret the behaviour of data through the calculation of central tendency measures and variability. • Identify the cause-and-effect relationship applying the calculation of conditional probabilities • Apply discrete and continuous probability distributions to the solution of problems that can be related to usual distributions. • Employ sample distributions to model the behaviour of central measures of dispersion of a set of data.
INTERNATIONAL COMPONENT	• Vocabulary and technical language to communicate in different cultural contexts. • Intercultural challenges. • Research and/or projects with international and intercultural components.
SUSTAINABLE DEVELOPMENT GOALS (SDG)	4. Quality Education
COURSE DETAILS	
COURSE DESCRIPTION	The course Probability and Statistics II develops and assures the mathematical reasoning surrounding the topics of random variables, parameter estimation, hypothesis tests, linear regression, and variance analysis (ANOVA). It provides tools for activities of administration and engineering, which require of the statistical inferences process to take decisions about different processes of uncertain behaviour. The students that take Probability and Statistics II learn to use sample information to suggest conclusions and take decisions regarding population problems. Afterwards they will use these methodologies to analyze recollected data from experimentation, while applying linear regression and variance analysis (ANOVA).
KEY WORDS:	Statistics, data visualization, variance analysis

COMPETENCES DEVELOPED

EICEA ILOS or Programme ILOS	Course ILOS	Type	Content	Teaching and Learning strategy	Assessment Method
ILO01 ILO02 ILO03 ILO04 BIMLA ILO7	Select a representative sample with the goal to make inferences about an origin population.	Skill	**Statistical Inference** **I. Use of data in R** 1. Description of surroundings: R-project, Rstudio, Rstudio Cloud.	Observation Based Learning	Progress in indicators of learning or performance are evaluated in

	BBA ILO08 BIB ILO08			2. Introduction of data 3. Getting basic measurements 4. Building of statistical graphs **II. Sampling methods and interval estimation** 1. Probabilistic and non-probabilistic sampling		different instances throughout the semester with quizzes, workshops, homework, group projects, individual tests, and a final exam, in which the student must demonstrate the learning objectives of the course. Rubrics will be used to evaluate de learning evidence and the respective feedback of the process and final answer. Exam feedback will be individual and collective work feedback will be given in groups.
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Build estimation intervals	Skill	2. Interval estimation in one and two samples.	Problems Based Learning	
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Compare parameters of the same nature in two populations.	Skill	**III. Hypothesis tests** 3. Sampling and trust intervals with R	Projects Based Learning	
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Validate formulated suppositions about the value of a populational parameter.	Skill	1. Hypothesis test in one sample.	Projects Based Learning	
	ILO01 ILO02 ILO03	Validate suppositions comparing the parameters in two populations.	Skill	2. Hypothesis test in two samples.	Projects Based Learning	

	ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08			3. Graphical method to compare means.		
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Validate dependence or goodness of fit in a set of data.	Skill	4. Goodness of fit and independence test.	Problems Based Learning	
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Adjusts the linear model regression and validates hypothesis of regression coefficients.	Skill	**Linear Regression (Simple – Multiple)** 1. Ordinary Least Squares 2. Properties of the estimation of ordinary least squares 3. Estimation and inferences about the regression coefficients 4. Prediction 5. Variance analysis 6. Transformations	Challenge Based Learning	
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Select the best set of covariables which explain a variable	Skill	7. Sequential methods to choose regression models	Problems Based Learning	
	ILO01 ILO02 ILO03	Does variance analysis in different populations.	Skill	**Variance analysis ANOVA** 1. Variance analysis techniques	Projects Based Learning	

	ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08			2. One factor ANOVA 3. Graphic methods and verifications of a model		
	ILO01 ILO02 ILO03 ILO04 BIMLA ILO7 BBA ILO08 BIB ILO08	Identify the variability components in a factorial experiment.	Skill	4. ANOVA of two or more factors	Projects Based Learning	

ILO01: Global Vision: Demonstrate an understanding of multicultural environments both in local and global contexts.

ILO02: Critical Thinking: Evaluate information using critical and analytical reasoning to address changing economic and business situations.

ILO03: Teamwork: Understand and work with others of different backgrounds to solve problems, develop meaningful relationships, and share knowledge.

ILO04: Ethics & Social Responsibility: Demonstrate awareness of ethical issues in business environments and contribute to the improvement of social conditions.

BBA ILO08: Communication: Communicate effectively in written and spoken manner in Spanish and English.

BIB ILO08: International Business Plan: Develop and apply entrepreneurial spirit and creative thinking through a business plan associated with an established company or a student start-up.

BIMLA ILO07: Apply technical skills associated with marketing and logistics in the decision making process of the firm.

BIBLIOGRAPHY

- WALPOLE, R. E., *Probabilidad y Estadística para Ingeniería y Ciencias*, Pearson Educación, 9a edición, México (2012).
- MONTGOMERY, D. C. & RUNGER, G. C., *Probabilidad y Estadística aplicadas a la ingeniería*, Limusa Wiley, 2a edición, México (2010).
- MILLONES, R., BARRENO, E., V_ASQUEZ, F. & CASTILLO, C., *Estadística aplicada a la ingeniería y los negocios*, Universidad de Lima-Fondo editorial, Perú (2015).
- LLIN_AS, H., *Estadística Inferencial*, Ediciones Uninorte, Colombia (2010).
- LEEKLEY, R. M., *Applied statistics for business and economics*, CRC Press (2010)