Theory of probability and mathematical statistics (Ist Year of study, IInd Semester)

Credit value (ECTS) 4

Course category
Domain (Compulsory courses)

Discipline Code: A.PCM.F.107

Course holder:
Lect. PhD. Emilian BULGARIU

Discipline objectives (course and practical works)

To familiarize students with the main types of problems and approaches in linear algebra and the application of mathematical concepts in economic and agricultural fields.

Mathematical modeling of practical problems frequently used in agricultural research and the understanding of probabilistic laws and optimization techniques.

Developing skills to use rigorous reasoning as well as individual study habits.

Forming a systemic understanding of the discipline and the mathematical apparatus.

Contents (syllabus)

Course
Elements of Abstract Algebra
Vector Spaces, linear dependence and independence, generating system, basis of a vector space, change of vector coordinates from one basis to another, substitution lemma, applications of the substitution lemma.
Linear Transformations, matrix associated with a linear transformation, kernel and image of a linear transformation, eigenvalues and eigenvectors.
Elements of Analytical Geometry
Elements of Linear Programming
Financial Mathematics
Elements of Probability Theory
Elements of Mathematical Statistics

Seminars
Matrices and Determinants. Operations with matrices. Determinants.
Systems of linear equations, Gauss method, Gauss-Jordan method, inverse of a matrix.
Independent linear system, dependent linear system, generating system, basis, change of coordinates of a vector from one basis to another.
Linear transformations, matrix associated with a linear transformation, kernel and image of a linear transformation, eigenvalues, and eigenvectors.
Analytical Geometry
Solving linear programming problems by graphic method.
Financial Mathematics
Events, operations, probabilities, conditional probabilities, total probability formula, Bayes' formula.

Classical Probability Schemes (Bernoulli, Poisson, Hypergeometric, Generalized Hypergeometric)
Random variables. Distribution function of a random variable. Numerical characteristics of random variables: mean, median, mode, quantiles, simple and centered moment, range, variance, standard deviation, Pearson coefficient of variability, Fisher coefficient of skewness, kurtosis and flattening coefficient.
Statistical series. Graphic representation of statistical series, absolute frequencies, relative frequencies, cumulative frequencies.
Regression method, correlation method.

References

1. **Burdujan I**.-*Elemente de matematici cu aplicaţii în Biologie*, Ed.Vasiliana'98, Iaşi 2001.
2. **Ciucu G., Craiu V.** - *Teoria estimaţiei şi verificarea ipotezelor statistice*, EDP, Bucureşti, 1971.
3. **Craiu V.** - *Verificarea ipotezelor statistice*, EDP Bucureşti, 1972.
4. **Stoleriu I.,** - *Statistică prin Matlab*, Ed. Matrixrom, București, 2010.
5. **Chiruță C.,** *Elemente de matematică - Programare liniară și statistică matematică*, Ed. Ion Ionescu de la Brad, iași, 2019
6. **BULGARIU E.,** *Indrumar pentru seminariile de Analiza Matematica***,** Ed. Ion Ionescu de la Brad, Iași, 2018

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Course	Exam	70%
	presence	10%
Practical works	Tests + course and practical	20%

Contact

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