

Mathematics applied to biology (Ist YEAR, IInd SEMESTER)

Credit value (ECTS) 4

Course category: Mandatory

Course holder: Lecturer Ciprian CHIRUȚĂ PhD

Discipline objectives (course and practical works)

Becoming familiar with the main types of issues and approaches in mathematics and applying mathematical concepts in economics and agriculture.

Mathematical modeling of practical problems commonly used in biological and agricultural research and learning the laws of probabilities and optimization techniques.

Acquiring skills for the use of rigorous reasoning and individual study skills;

Forming a systemic point of view on the field and apparatus of Mathematics.

Acquiring the computation skills necessary for the mastering of the mathematical reasoning in using statistic tests;

Understanding the probability theory and linear programming notions using appropriate practical examples;

Applying the given theoretical concepts in order to solve specific problems and modeling processes.

Knowledge of statistical research methods in the field and their application in the profile disciplines.

Contents (syllabus)

Course (chapters/subchapters)
Mathematical induction method. Arithmetic progressions, geometric progressions
Combinatorics. Counting methods, Permutations, Arrangements, Combinations.
Probability theory elements
Events. Operations with events. Probabilities. Conditional probabilities. Formulas for calculating probabilities.
Classical probability schemes, discrete and continuous random variables. Operations with random variables. The distribution function of a random variable. Typical values of a random variable. Covariance.
Discrete distributions. Continuous distributions.
Elements of statistics
Organization and describing data. Grouping and graphic representations of the statistical series, Numerical characteristics of statistical series, absolute frequency, relative frequency, cumulative frequencies. Regression, correlation method.
Estimation theory. Estimates point. Estimates by confidence intervals.
Statistical tests.
Practical works
MS Excel. Data types: text, numbers, calendar date, time, formulas;

MS Excel. Formatting, references: relative, absolute, mixed;
MS Excel. Edit menu, CUT, COPY, PASTE, SPECIAL PASTE; FILL command.
MS Excel. Formulas: mathematical, statistical and trigonometric; IF command.
MS Excel. Graphic representation of statistical data;
MS Excel. Numerical characteristics of statistical series. Mean, individual deviation, dispersion, mean square deviation (standard deviation), coefficient of variability;
MS Excel. Absolute frequency, relative frequency, cumulative frequencies;
MS Excel. Linear regression, multilinear regression, correlation;
MS Excel. Parametric tests: Student test, Fisher test;
MS Excel. Anova one way, Anova two way.

Bibliography

1. Aldea Florica, *Matematici aplicate în științele agricole și silvice*, Editura Risoprint, Cluj Napoca, 2006.
2. Bunu I. coord. colectiv de autori, *Matematici economice*, Departamentul Editorial Poligrafic al Academiei de Studii Economice a Moldovei, Chișinău, 2012.
3. Burdujan I., *Elemente de algebră cu aplicații în biologie*, Ed. Pim, Iași, 2006.
4. Jaba Elisabeta, *Statistică* - ediția a doua - Editura Economică, București, 2000.
5. Jaba Elisabeta, *Statistică descriptivă - manual pentru învățământ deschis la distanță*, Ed. Univ. Al. I. Cuza, Iași, 2005.
6. Jaba Elisabeta, Pintilescu Carmen, *Statistică - teste grilă și probleme*, ediția a doua, Ed. SedcomLibris, Iași, 2007.
7. **Chiruță C.**, *Elemente de matematică. Programare liniară și statistică matematică*, Editura „Ion Ionescu de la Brad” Iasi, 2019.

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Colocviu	Practical examination	70%
Evaluation during the semester	Attendance at seminars and verification test	10% + 20%

Contact

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