UNIVERSITY
WARMIA AND MAZURY IN OLSZTYN

Faculty of Mathematics and Computer Science

Course title: **MATHEMATICAL STATISTICS**

ECTS credit allocation (and other scores): **6**

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English /Polish

Number of hours per semester: 30 lectures + 45 classes = 75 hours

Course coordinator/ Department and e-mail: Adam Lecko/ WMiI, alecko@matman.uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES:

The use of classical and geometrical definition of probability. Conditional probability. Bayes' formula. Probability distribution, discrete distribution function. The density of the probability distribution function of a random variable continuous type. The parameters of random variables. Some probability distributions. Limit theorems and examples of their applications. Determination of confidence intervals for the mean and variation. Verification of statistical hypotheses.

LECTURES:

Sequences of random variables. The laws of large numbers. Central Limit Theorem. Descriptive statistics. Statistical space. Basic concepts of mathematical statistics. Chi-square distribution, Student t-distribution, F-Snedecor distribution. Classification of estimators. Properties of estimators. Point estimation. Interval Estimation. Confidence intervals. The issue of the minimum sample size. Verification of statistical hypotheses. Parametric tests. The power of the test. Significance tests. Nonparametric tests. Compatibility, independence and randomness tests.

LEARNING PURPOSE

Ability to use theorems to solve probabilistic problems and statistical models to solve common statistical problems.

On completion of the study programme the graduate will gain:

Knowledge:

W1 – The student lists the elements of descriptive and mathematical statistics; The student lists the concepts and laws of the probability calculus; The student lists the methods of the theory of estimation and verification of statistical hypotheses;

Skills:

The student uses the concept of statistical space; builds and analyzes a mathematical model of a random experiment; Student gives various examples of probability distributions used in statistics; Student uses point and interval estimation methods; Uses parametric and nonparametric tests.

Social Competencies:

The student knows the limitations of his own knowledge and understands the need for further education; The student works as a team; understands the necessity of systematic work on all projects that are of a long-term nature.

BASIC LITERATURE

1. W. Krysicki. J. Bartos, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, Wyd. PWN, R. 1999
2. W. Kordecki, Rachunek prawdopodobieństwa i statystyka matematyczna, Wyd. GIS, R. 2001

SUPPLEMENTARY LITERATURE

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 3,04 ECTS points,

Student's independent work: 2,96 ECTS points,