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| **Course code** | CC2 |
| **Type and description** | TCS core curriculum |
| **ECTS credit** | 1 |
| **Course name** | **Statistics** |
| **Course name in Polish** | **Statystyka** |
| **Language of instruction** | English |
| **Course level** | 8 PRK |
| **Course coordinator** | **dr hab. inż. Wojciech Tylman** |
| **Course instructors** | **dr hab. inż. Wojciech Tylman** |
| **Delivery methods and course duration** | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | **Lecture** | **Tutorials** | **Laboratory** | **Project** | **Seminar** | **Other** | **Total of teaching hours during semester** | | Contact hours | 4 |  |  | 26 |  |  | 30 | | E-learning | No | No | No | No | No | No |  | | Assessment criteria (weightage) | 20% |  |  | 80% |  |  |  | |
| **Course objective** | 1. To make student acquainted with basic concepts and tools of descriptive statistics,  2. To make student acquainted with selected concepts and tools of statistical inference,  3. To make students acquainted with distributions commonly used in statistical inference,  4. To make students conscious of problems, errors and pitfalls associated with statistics.  5. To make student acquainted with basic concepts of normative decision theory. |
| **Learning outcomes** | 1. Can use descriptive statistics to summarise a sample,  2. Knows and understands distributions commonly used in statistics, their role and means of computation,  3. Can use statistical inference in parameter estimation, hypothesis testing, confidence interval computation,  4. Can analyse relations between two populations,  5. Can employ statistics in problems related to research discipline and critically analyse results reported by others.  6. Can analyse relations between more than two populations,  7. Can perform non-parametric statistical analysis of data,  8. Knows and understands basics of normative decision theory. |
| **Assessment methods** | Series of individual projects employing concepts presented during course. |
| **Prerequisites** | Basic knowledge of mathematics, including probability theory. |
| **Course content with delivery methods** | LECTURE  1. Origins and branches of statistics,  2. Collecting data for statistical purposes,  3. Measures used to describe data sets: central tendency, variability, shape,  4. Sampling distributions,  5. Normal and t-distribution,  6. Chi-squared distribution,  7. Statistical hypothesis tests,  8. Confidence intervals,  9. Model-selection tests,  10. Correlation and regression,  11. Independence tests.  12. Analysis of variance (ANOVA),  13. Rank statistics,  14. Basic concepts of normative decision theory.  PROJECT  1. Describe example data set through descriptive statistics,  2. Using example data, compute parameters of a sampling distribution,  3. Based on the sampling distribution, construct hypothesis test and compute confidence intervals,  4. Determine statistical relationships between two example data sets.  5. Apply statistical methods to a real-life problem, connected with the research discipline. |
| **Basic reference materials** | 1. William Navidi: Statistics for Engineers and Scientists, McGraw-Hill Education, 2014. 2. Sarah Boslaugh: Statistics in a Nutshell, O'Reilly Media, 2012. 3. Martin Peterson: An Introduction to Decision Theory, Cambridge University Press, 2017. |
| **Other reference materials** |  |
| **Average student workload outside classroom** | 20 h |
| **Comments** |  |
| **Last update** |  |