



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Engineering data analysis [N1Mech2>ADI]

### Course

Field of study  
Mechatronics

Year/Semester  
1/1

Area of study (specialization)  
–

Profile of study  
general academic

Level of study  
first-cycle

Course offered in  
Polish

Form of study  
part-time

Requirements  
compulsory

### Number of hours

Lecture  
16

Laboratory classes  
0

Other  
0

Tutorials  
8

Projects/seminars  
0

### Number of credit points

3,00

### Coordinators

### Lecturers

### Prerequisites

The student has basic knowledge of mathematics and probability. Has the ability to think logically and to perform basic mathematical calculations. Is aware of the need for teamwork, learning and acquiring new skills and knowledge.

### Course objective

The aim of the course is to provide students with the basics of knowledge in the field of data analysis methods in engineering research, which includes methods for data description and presentation as well as their analysis and developing the skills of its practical application in solving specific tasks and engineering problems in production engineering.

### Course-related learning outcomes

Knowledge:

Student knows the basic definitions and concepts in the field of engineering statistics.

Student is able to name the population, sample, feature, define basic statistical measures describing the sample and population, probability distribution and related parameters.

Student knows the basic distributions for discrete and continuous features. Student is able to perform calculations related to them..

### Skills:

Student can describe a random sample using the known statistical measures.

Student can visualize the results of the sample using the known graphical methods. He can apply these skills in solving engineering problems.

Student can determine the probability of certain events using the known theoretical probability distributions describing the features shaped in the manufacturing processes. Is able to use for this purpose both formulas of probability distribution functions and uses statistical tables. He applies these skills on examples embedded in engineering issues.

### Social competences:

Student is aware of the impact of conclusions from statistical analyzes on engineering decisions.

Student is aware of the quality of data and statistical conclusions and is sensitive to any manipulation in statistical inference.

Student is aware of the role of statistical analyzes in engineering activities.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: credit based on a test, carried out at the end of the semester (the threshold of passing is 50%).

Tutorials: credit is given on a test, carried out at the end of the semester (the threshold of passing is 50%).

Students are informed about test schedule at the first meeting.

## Programme content

### Lecture:

1. Methods of describing and presenting data from engineering research.
2. Methods for graphical presentation of data from engineering research.
3. Methods of assessing risk and probability in manufacturing processes. Computations related to it.

### Tutorials:

They rely on the team or individual use of knowledge of the subject provided in the lecture in solving engineering tasks and problems.

## Course topics

### Lecture:

1. Methods of describing and presenting data from engineering research (descriptive statistics - statistical measures from sample and population).
2. Graphical methods of data presentation - histogram, boxplot.
3. Methods for assessing risk and probability in manufacturing processes (probability distributions of continuous and discrete random variables - binomial, Poisson and normal distribution).

### Tutorials:

They rely on the team or individual use of knowledge of the subject provided in the lecture in solving engineering tasks and problems.

## Teaching methods

Lecture: multimedia presentation illustrated with examples given on the blackboard, active participation in classes; consultations.

Tutorials: solving tasks, practical exercises, discussion, case study.

## Bibliography

### Basic:

1. Aczel A.D., Statystyka w zarządzaniu, PWN, Warszawa 2000.
2. Bobrowski D., Probabilistyka w zastosowaniach technicznych, WNT Warszawa 1986.
3. Hamrol A: „Zarządzanie jakością z przykładami”, PWN Warszawa 2011

### Additional:

1. Starzyńska W., Statystyka praktyczna, Wydawnictwo Naukowe PWN, Warszawa 2005.
2. Viking G.G., Statistical Methods for Engineers, Duxbury-Brooks/Cole, Pacific Grave, CA 1998.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	24	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	51	2,00