



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Decision making support methods

### Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

Tutorials

10

Projects/seminars

Other (e.g. online)

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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### Prerequisites

The student has knowledge in the field of production management, as well as technical knowledge related to the mechanical engineering discipline. Knows the basics of statistics.

The student has the ability to think logically and perform basic mathematical calculations.

The student is able to analyze, evaluate and express their opinion on a given topic. She is open to other people's opinion.

### Course objective

To acquaint students with tools and methods supporting decision making.



### Course-related learning outcomes

#### Knowledge

1. The student is able to describe decision support algorithm and indicate the tools necessary to apply this algorithm.
2. The student knows the statistical tools suitable to analyse the data necessary to make decisions.

#### Skills

1. The student knows how to perform a statistical analysis of current and historical data necessary to make a decision; knows how to develop, apply and use indicators to facilitate decision making.
2. The student knows how to develop a decision task model and then analyze possible decisions using decision support methods.
3. Student is able to apply selected computer programs in the decision making process

#### Social competences

The student is creative, working in a team can justify his decisions and is aware of the responsibility related to them.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - based on an exam (the threshold of passing is 50%).

Laboratory - based on the assessment of tasks implemented during laboratory exercises and direct conversation with students during the implementation of tasks.

### Programme content

1. Methods of multi-criteria decision making support - basic terminology of multi-criteria decision making support (MCDM), decision problem, attributes, criteria, problems solved by MCDM methods, division of methods by the way of providing preferential information from the decision maker. Chosen methods from AHP, UTA, SMART, ELECTRE III.
2. Methods of supporting decision making from Data Mining area, tasks of Data Mining methods, classification, regression and grouping methods, the method of k nearest neighbors, naive Bayes classifier, cluster analysis.

### Teaching methods

Lecture: multimedia presentation illustrated with examples given on a blackboard.

Laboratory exercises: solving tasks, discussion, teamwork. Work at computer workstations. Classes conducted in the form of gamification.

### Bibliography



Basic

1. Nermend K. Metody analizy wielokryterialnej i wielowymiarowej we wspomaganiu decyzji, PWN, 2017
2. Larose D.: Odkrywanie wiedzy z danych. PWN, Warszawa 2013.
3. Trzaskalik T.: Wielokryterialne wspomaganie decyzji. Metody i zastosowania. PWE, Warszawa 2014.
4. Trzaskalik T.: Wielokryterialne wspomaganie decyzji. Przegląd metod i zastosowań. Zeszyty Naukowe Politechniki Śląskiej. Seria: Organizacja i Zarządzanie, 74, 239-263, 2014.

Additional

1. R.Knosala (red.): Zastosowanie metod sztucznej inteligencji w inżynierii produkcji. WNT, Warszawa 2002.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	45	1,5

<sup>1</sup> delete or add other activities as appropriate