



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

DECISION AIDING FOR ENGINEERING AND MANAGEMENT

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### Course

Proposed by Discipline

Management and  
quality studies

Type of studies

Doctoral School

Form of study

full-time

Year/Semester

II/3

Course offered in

English

Requirements

elective

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### Number of hours

Lecture

8

Tutorials

Projects/seminars

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### Number of credit points

2

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### Lecturers

Responsible for the course/lecturer:

Dr hab. inż. Jacek ŻAK, prof. PUT

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Faculty of Engineering Management

Poznan University of Technology

ul. J. Rychlewskiego 2

60-965 Poznan, Poland

Responsible for the course/lecturer:

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### Prerequisites

Knowledge: Basic mathematics. Understanding of mathematical models. Understanding the role and power of decision making.

Skills: Analytical skills. Logical reasoning.



Social competencies: Communication skills. Team work.

### Course objective

Provide methodological background to rational decision making in Engineering and Management. Introduce students to the basic concepts of Decision Making/ Aiding. Present the Methodology of Multiple Criteria Decision Making/Aiding.

### Course-related learning outcomes

#### Knowledge

A doctoral student participating in the course knows and understands:

- global achievements, covering theoretical foundations as well as general and selected specific issues that are relevant to scientific disciplines studied at the Doctoral School, to the extent that enables revision of existing paradigms - **P8S\_WG/ SzD\_W01**
- scientific research methodology in disciplines represented at the Doctoral School - **P8S\_WG/SzD\_W03**

#### Skills

A doctoral student participating in the course can:

- use knowledge from different branches of science to creatively identify, formulate and innovatively solve complex problems or to perform research tasks such as:
  - define the aim and subject of scientific research, form a research hypothesis,
  - develop research methods, techniques and tools and use them creatively,
  - draw conclusions on the basis of research results - **P8S\_UW/ SzD\_U01**

#### Social competencies

A doctoral student participating in the course is ready to:

- acknowledge the importance of knowledge in solving cognitive and practical problems - **P8S\_KK/SzD\_K03**

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W01, W03	Case studies - active participation in discussion and problem solving exercises.	Quality of the feedback provided; assessment of the students' work in the classroom.
U01	Problem solving exercise - development of a real life solution. Project in DA/DM.	Quality of the generated solution. Project assessment – final score.
K03	Readings - class discussion. Team work.	Assessment of the quality of class discussion.



### Programme content

Presenting the power and methodology of rational decision making. Description of basic rules and features of Decision Making and Decision Aiding.

### Course topics

1. Definition and Basic Concepts of Decision Making / Aiding.
2. Introduction to Multiple Criteria Decision Making/ Aiding (MCDM/A).
3. Application of MCDM/A in Engineering and Management. Solving selected decision problems.

### Teaching methods

Interactive lecture. Discussion. Case studies.

### Bibliography

#### Basic

1. Żak J.: Multiple Criteria Decision Making/ Aiding in Engineering. Teaching Materials for Graduate Students. Poznań University of Technology, EU Program: "Engineer of the Future", Poznań, 2014.

#### Additional

1. Figueira, S. Greco and M. Ehrgott: Multiple Criteria Decision Analysis. State of the Art Surveys. Springer, New York, 2005.
2. Żak J.: The Methodology of Multiple Criteria Decision Making/Aiding in Transportation. W: Żak J., Hadas Y., Rossi R.: Advanced Concepts, Methodologies and Technologies for Transportation and Logistics. Springer, Berlin 2018, ss. 9-38.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	8	0,0
Doctoral student's own work (literature studies, preparation for tutorials and case studies, project preparation, problem solving) <sup>1</sup>	42	2,0

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