STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mathematical Decision Making		**1011102111010346436**
Field of study	Profile of study (general academic, practical)	Year /Semester
Safety Engineering - Full-time studies - Second-	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Work Safety Management	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
Second-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **15** Classes: **30** Laboratory: **-** Project/seminars: **-**		**4**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
other	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Students have knowledge of mathematics, particularly calculus and algebra.
2	**Skills**	Students can determine the extremes of functions of one variable, compute the partial derivatives, operate on matrices. Students can check the basic properties of the relationship.
3	**Social competencies**	Students are eager to learn.

Assumptions and objectives of the course:

The aim of the course is to familiarize students with the different methods that help in making the best decisions.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Students know and understand methods to make optimal decisions. - [K2A-W01, K2A-W04]
2. Students know a mathematical model and the optimization criterion for the real issues. - [K2A-W01, K2A-W04]

Skills:

1. Students are able to formulate a mathematical model of linear and nonlinear programming problems. - [K2A-U1-5, K2A-U10, K2A-U12, K2A-U18]
2. Students can discuss the real issues of the optimal solution for any changes in the input data. - [K2A-U1-5, K2A-U10, K2A-U12, K2A-U18]
3. Students can analyze the decision problem in terms of expectations for the results obtained and the amount of work needed to receive. - [K2A-U1-5, K2A-U10, K2A-U12, K2A-U18]

Social competencies:

1. Students understand the need and knows the possibilities of lifelong learning. - [K2A-K1, K2A-K3]
2. Students see the opportunity to use the learned knowledge into practice. - [K2A-K1, K2A-K3]

Assessment methods of study outcomes

Formative assessment:

a) In regards to classes: on the basis of two written tests.

b) Regarding lectures: on the basis of oral or written assignments relating to the material covered during current or previous lectures.

Collective assessment:

a) In respect to classes:receive 51% of the total points is equivalent to completing the exercise, the assessment "change" every 10 percentage points.

b) Considering lectures: the average of formative marks.

Course description

Update 2017/2018.

? Mathematic programming

? Network algorithms: determination of the shortest path in the graph, determination of the maximum flow in the transport network

? Transport Problems

? Games

? Rough set theory;

? Relations: orders

? Fuzzy set theory

Applied methods of education.

Lecture:

1. Interactive lecture with formulationquestions to a group of studentsor to specific students indicated.
2. Theory presented in connection with current knowledge students.
3. The activity of the students is taken into account during the classes when giving a final grade.

Practical lessons:

1. Solving example tasks on the board.
2. Detailed review of task solutions and discussions on comments.
3. Initiate discussion on solutions.

Basic bibliography:

1. Grabowski W., Programowanie matematyczne, PWE Warszawa 1980.
2. Martos, Béla., Programowanie nieliniowe.Teoria i metody, PWN 1983r.
3. Łachwa A., Rozmyty świat zbiorów, liczb, relacji, faktów, reguł i decyzji, Wydawnictwo EXIT, Warszawa 2001.
4. Roy B., Wielokryterialne wspomaganie decyzji, WNT, Warszawa, 1990.

Additional bibliography:

1. Simonnard L., Programowanie Liniowe, PWN, Warszawa 1967.
2. Kukuła K. (red.), Badania operacyjne w przykładach i zadaniach, PWN, W-wa 2004.
3. Lindgren B.W., Elementy teorii decyzji, WNT, Warszawa 1977.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in exercises	30
3. Consultation	5
4. Preparing for training	15
5. Preparing for colloquia	20

Student's workload

Source of workload	hours	ECTS
Total workload	85	4
Contact hours	50	2
Practical activities	50	2