COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematical Decision Making

Course

Field of study

Safety Engineering

Area of study (specialization)

Integrated Work Safety Management

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

1\1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

10

Tutorials

16

Laboratory classes

Projects/seminars

Other (e.g. online)

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Ph.D., Piotr Rejmenciak

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Faculty of Automatic Control, Robotics and Electrical Engineering

ul. Piotrowo 3A, 61-138 Poznań

Responsible for the course/lecturer:

Prerequisites

Students can determine the extremes of functions of one variable, compute the partial derivatives, operate on matrices.

Course objective

To familiarize students with the scope and purpose of building mathematical models, creating and using simple mathematical decision models.

Course-related learning outcomes

Knowledge

-the student knows the issues related to Mathematical Decision Making: linear programming, nonlinear programming, networks, transport issues, fuzzy sets, game theory,

-the student knows the issues of the possibility of using Mathematical Decision Making in the field of occupational safety and ergonomics,

[P7S_WG_01, P7S_WG_02].

Skills

- based on the received data , the student can choose the proper method in order to make the right decision,
- using data , the student can plan and conduct experiments, interpret obtained results and draw conclusions,
- the student can make decisions based on mathematical methods,
- the student can formulate and justify the opinion on the selected decision.

[P7S_UW_01, P7S_UW_02, P7S_UW_03]

Social competences

-th estudent is aware of the need to recognize the cause-and-effect relationships that are relevant during the implementation of the set goals and rank the importance of alternative or competitive tasks.

[P7S_KK_01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- lectures: written final test on the last lecture, the student receives credit after obtaining at least 51% of points possible to obtain

- classes: 2 tests, the student receives credit after obtaining at least 51% of points possible to obtain

Programme content

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Mathematic programming; network algorithms: determination of the shortest path in the graph, determination of the maximum flow in the transport; networks; transport problems; games; making decisions with many goals and in conditions of uncertainty; fuzzy set theory.

Teaching methods

- lectures: multimedia presentation supplemented by examples given on the board.

- classes: solving sample tasks on the board.

Bibliography

Basic

1. Jędrzejczyk Z., Kukuła K., Skrzypek J., Walkosz A. (2014), Badania operacyjne w przykładach i zadaniach, Wydawnictwo Naukowe PWN, Warszawa.

2. Lindgren B.W. (1977), Elementy teorii decyzji, WNT, Warszawa.

3. Łachwa A. (2001), Rozmyty świat zbiorów, liczb, relacji, faktów, reguł i decyzji, Wydawnictwo EXIT, Warszawa.

4. Zangwill W.I. (1974), Programowanie nieliniowe, WNT, Warszawa. 2001r.

Additional

1. Simmonard L. Programowanie Liniowe, PWN, Warszawa 1969.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for classes, preparation for tests, project preparation) [1]	70	2,5