

Decision Support Systems - course description

General information	
Course name	Decision Support Systems
Course ID	06.9-WM-ZiIP-ANG-D-06_20
Faculty	Faculty of Mechanical Engineering
Field of study	Management and Production Engineering
Education profile	academic
Level of studies	Second-cycle studies leading to MSc degree
Beginning semester	winter term 2023/2024

Course information	
Semester	1
ECTS credits to win	3
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">prof. dr hab. Taras Nahirnyymgr Karol Dąbrowskidr Katarzyna Skrzypek

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Project	15	1	-	-	Credit with grade
Lecture	15	1	-	-	Credit with grade

Aim of the course

Acquisition of skills and competences in decision support system (DSS) and methods used in decision process analysis which are useful in further educational process and vocational work. Also knowledge and skills of chosen tools and technique used in decision support systems will be given.

Prerequisites

Basic of computer science, probability, statistic

Scope

Lecture:

W1: Introduction to the theory of decision-making. Confidence, risk, uncertainty.

W2 - W3: Mathematical modeling and decisions, operations research models and econometric statistical decision theory, decision analysis, decision trees.

W4 - W5: The theory of reliability and usability and decision-making. The decisions in terms of inaccuracy. Game theory and the decisions, game double zero-sum and non-zero; importance of information, cooperative games; negotiations; distribution of payments in the coalition; balance, optimal strategies. Examples of applications in business practice.

W6 - W7: Decision Support Systems and Information Systems Management, Principles of creation and utilization systems.

Project. Development of the project in the field of production engineering issues, taking into account the theoretical basis and principles of the work program concerning:

- selection of probe items,
- forecasting and linear regression,
- allocation of resources and balancing production lines,
- serial work,
- linear programming, integer and 0-1,
- dynamic programming,
- stock management,
- PERT-CPM,
- modelling network,
- systems queuing,
- simulation of queuing systems
- economy materials

- quality control charts.

Teaching methods

Conventional lecture.

Project – individual work, group work with DSS systems, based on literature and the lecture notes

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student has theoretical detailed knowledge of decision support systems.	<ul style="list-style-type: none">K_W04	<ul style="list-style-type: none">a projectan evaluation test	<ul style="list-style-type: none">LectureProject
Student knows the basic methods and techniques used in decision support systems.	<ul style="list-style-type: none">K_W18	<ul style="list-style-type: none">a projectan evaluation test	<ul style="list-style-type: none">LectureProject
The student is able to formulate and test hypotheses, related to engineering problems and simple research problems.	<ul style="list-style-type: none">K_U19	<ul style="list-style-type: none">a projectan observation and evaluation of activities during the classes	<ul style="list-style-type: none">LectureProject
The student can use to formulate and solve engineering tasks selected analytical methods and simulation	<ul style="list-style-type: none">K_U13	<ul style="list-style-type: none">a projectan observation and evaluation of the student's practical skills	<ul style="list-style-type: none">Project
The student understands the need for learning	<ul style="list-style-type: none">K_K01	<ul style="list-style-type: none">activity during the classes	<ul style="list-style-type: none">Project
The student is able to design and manage mechanical engineering databases.	<ul style="list-style-type: none">K_U28	<ul style="list-style-type: none">an ongoing monitoring during classes	<ul style="list-style-type: none">LectureProject
The student is able to think and act in a creative and enterprising	<ul style="list-style-type: none">K_K06	<ul style="list-style-type: none">a projectan evaluation test	<ul style="list-style-type: none">LectureProject
Student is able to use information technologies relevant to the implementation of selected tasks of decision-making in business engineering	<ul style="list-style-type: none">K_U26	<ul style="list-style-type: none">a projectan observation and evaluation of the student's practical skills	<ul style="list-style-type: none">Project

Assignment conditions

Lecture: graded credit

The assessment is issued based on a written test covering the verification of the knowledge of basic problems.

Project: graded credit

The assessment is determined on the basis of the component evaluating skills related to the implementation of project tasks, the prepared report and a component for the student's "defence" of the report.

Recommended reading

1. Taylor, James (2012). Decision Management Systems: A Practical Guide to Using Business Rules and Predictive Analytics. Boston MA: Pearson Education.
2. Burstein, Frada & Frada, & Holsapple, Clyde & Clide,. (2008). Handbook on Decision Support Systems 1: Basic Themes. 10.1007/978-3-540-48713-5.
3. Burstein, Frada & Frada, & Holsapple, Clyde & Clide,. (2008). Handbook on Decision Support Systems 2: Variations. 10.1007/978-3-540-48716-6.
4. Power, D. J. (2002). Decision support systems: concepts and resources for managers. Westport, Conn., Quorum Books.

Further reading

1. Borges, J.G, Nordström, E.-M. Garcia Gonzalo, J. Hujala, T. Trasobares, A. (eds). (2014). " Computer-based tools for supporting forest management. The experience and the expertise world-wide. Dept of Forest Resource Management, Swedish University of Agricultural Sciences. Umeå. Sweden.
2. Delic, K.A., Douillet,L. and Dayal, U. (2001) "Towards an architecture for real-time decision support systems:challenges and solutions.

Notes

Modified by dr Katarzyna Skrzypek (last modification: 19-04-2023 18:15)

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