COURSE DESCRIPTION CARD - SYLLABUS

Course name
Risk analysis [S1IBiJ1>AR]

Course

Field of study
Safety and Quality Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

A student starting this subject should have basic knowledge of probability theory and basic techniques. He should also be able to obtain information from sources indicated by the teacher

Course objective

Acquiring by the student the knowledge (systematics and methodology) needed to identify threats and analyze the risks associated with them using quantitative and qualitative methods

Course-related learning outcomes

Knowledge:
1. Explains concepts related to risk, including adverse, initiating, and critical events, and understands the division of threats into potential and real.
2. Understands the differences between occupational, process, and environmental risk, and risk

assessment methodologies, including matrix, index, and graphical methods.
3. Knows mathematical and statistical methods used in risk analysis, including multidimensional risk analysis and determining risk acceptability using probabilistic methods.
4. Is familiar with advanced topics in quality engineering, focused on the optimization of processes and products, including risk analysis.

Skills:
1. Identifies risks and contingencies in the product life cycle and in the product realization processes, using appropriate methods for risk estimation [K1_U01].
2. Analyzes and evaluates risks using a variety of methods, taking into account systemic, socio-technical, organizational and economic aspects [K1_U03].
3. Prepares risk minimization strategies using knowledge of safety principles in industrial environment [K1_U05].
4. Performs critical analysis and optimization of existing technical solutions to enhance safety and quality of machinery, equipment, facilities, systems, processes and services [K1_U06].

Social competences:
1. Understands and applies knowledge of risk analysis to perceive cause-and-effect relationships in the achievement of objectives, applying ranks to the importance of tasks [K1_K01].
2. Is aware of the impact of engineering activities on the environment and society, including responsibility for decisions related to risk analysis and its consequences [K1_K03].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
a) laboratory classes: assessment of current progress of task implementation
b) lectures: answers to questions about the content of previous lectures,
Summative rating:
a) laboratory classes: presentation of reports on exercises performed (arithmetic average of partial grades);
b) lectures: Tests consist of 20-30 questions (test), scored on a two-point scale of 0, 1. Passing threshold: 50% of points.

Programme content

The program covers the basics of risk analysis in selected aspects: risk-related concepts, estimation methods, and determining the risk level.

Course topics

The lecture program covers the following topics:
Risk concepts.
Division of threats.
Risk estimation.
Determining safety losses.
Multidimensional risk analysis.
Determining risk acceptability based on probabilistic methods
Laboratories:
Risk in the product life cycle - allocation of risks to individual phases of the cycle. Product implementation processes - identification of threats, emergency events, emergency scenario, risk estimation.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.
2. Laboratories:: multimedia presentation illustrated with examples given on a blackboard and performance of tasks given by the teacher - practical exercises.

Bibliography

Basic:

Thlon M., Charakterystyka i klasyfikacja ryzyka w działalności gospodarczej. Zesz. Nauk. UEK, 2013; 902: 17–36
Matuszek J, Brylska-Bienias K., Ocena i redukcja ryzyka technicznego maszyn, 2016, http://www.ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2016/T2/t2_0423.pdf
Biedugnis S., Smolarkiewicz M., Podwójci P., Czapczuk A., Mapy ryzyka funkcjonowania rozległych systemów technicznych, 2007, https://ros.edu.pl/images/roczniki/archive/pp_2007_022.pdf
Jasiulewicz-Kaczmarek M., 2015, Practical aspects of the application of RCM to select optimal maintenance policy of the production line, In: Nowakowski, T; Mlynczak, M; Jodejko-Pietruczuk, A; et al. Safety and Reliability: Methodology and Applications - Proceedings of the European Safety and Reliability Conference, ESREL 2014 Location: Wroclaw, POLAND Date: SEP 14-18, 2014 Taylor & Francis Group, London, 2015, pp. 1187-1195, ISBN 978-1-138-02681-0
Pamuła W., Niezawodność i bezpieczeństwo. Wybór zagadnień, Wydawnictwo Pol.Śl. Gliwice, 2011

Additional:
Pietrzak L., Modelowanie wypadków przy pracy. Bezpieczeństwo pracy, 4/2002
PN-EN 61882 HAZOP, Badania zagrożeń i zdolności do działania

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	48	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	52	2,00