COURSE DESCRIPTION CARD - SYLLABUS

Course name
Reliability structures [N2IBiJ1-BiZK>SN]

Course

Field of study
Safety and Quality Engineering

Year/Semester
1/2

Area of study (specialization)
Safety and Crisis Management

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
10

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
10

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

A student beginning this course should have basic knowledge of mathematical statistics, basics of machine operation, basics of technological design, occupational health and safety, ergonomics and psychology. The student should know the general principles of operation of technical facilities and modern concepts of management. The student should be able to recognize cause and effect relationships in the area of broadly understood security and the basics of business continuity management.

Course objective

Providing students with the basics for understanding the theoretical and practical aspects of rational shaping of optimal work safety conditions. Developing knowledge and skills in improving work organization.

Course-related learning outcomes

Knowledge:
1. The student knows in depth the methods and theories used in solving the problems of modern safety engineering and crisis management [K2_W03].
2. The student knows in depth the design methodology that takes into account the principles of safety, and crisis management in implementing of reliability structures [K2_W09].

Skills:
1. The student is able to properly select sources, including literature, and information derived from them, as well as evaluate, critically analyze, synthesize and creatively interpret this information, formulate conclusions and comprehensively justify the opinion during the presentation of the results of implementation of reliability structures [K2_U01].
2. The student is able to formulate and test hypotheses related to simple research problems characteristic of safety engineering and crisis management [K2_U04].

Social competences:
1. The student is critical of his knowledge, is ready to consult experts when solving cognitive and practical problems of implementing of reliability structures related to safety management in organizations [K2_K01].
2. The student is ready to initiate activities related to improving safety in reliability structures, taking into account pro-ecological solutions [K2_K03].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
- project classes: assessment of progress in the implementation of the project task (according to the adopted schedule of the project task implementation) taking into account the activity during the classes according to the following scale of points, from 0 to 5: very good - from 4.6 to 5; good plus - from 4.1 to 4.5; good - from 3.6 to 4.0; sufficient plus - from 3.1 to 3.5; sufficient - from 2.5 to 3.0; insufficient - from 0 to 2.4,
- lectures: the acquired knowledge is verified by questions and answers to posed during the discussion focused on current problems discussed in the lecture.
Summative assessment:
- project classes: evaluation of the completed project, taking into account the assessment of progress in the implementation of the project task and activity during project classes, according to the following scale of points, from 0 to 5: very good - from 4.6 to 5; good plus - from 4.1 to 4.5; good - from 3.6 to 4.0; sufficient plus - from 3.1 to 3.5; sufficient - from 2.5 to 3.0; insufficient - from 0 to 2.4.
- lectures: two 15-minute tests carried out during the 2nd and 5th lecture. Each test consists of 3-5 questions (test and open-ended) with different points (on a scale from 0 to 2); the student receives credit after reaching at least 50% of the possible points.

Programme content

The program includes: Fundamentals of operational reliability; General concept of risk model.

Course topics

The lecture program covers the following topics:
Modeling phenomena leading to failure;
Destruction system;
Classification of objects in terms of operational reliability;
Indicators of in-service and service reliability;
Characteristics of basic reliability structures;
Durability and readiness of technical objects;
Active reliability enhancement, parametric excess, functional bearing, temporal excess, informational excess
information;
Anti-destruction systems;
Operation operator support system;
Evaluation of the support system based on operational indicators, evaluation and analysis indicators of efficiency and safety of machine operation.

Students carry out the design of a reliability structure for a selected organizational unit.

Teaching methods

- Lecture classes: problem lecture with elements of collecting premises and the stage of solving the problem.
The lecture is conducted using distance learning techniques in a synchronous mode. Acceptable platforms: eMeeting, Zoom, Microsoft Teams.
- Project: multi-stage cognitive task.

Bibliography

Basic:
1. Sławińska M. Berlik M., Słoniec J., (2021), Occupational Risk Management on the Basis of Accident Scenarios in the Usage Chain, European Research Studies Journal, vol. XXIV, Special Issue, pp. 417-427, DOI: 10.35808/ersj/2273.
2. Sławińska M., Wróbel K., (2021). Indicative Method of Human Failure in Sustainable Chain of Custody Management, European Research Studies Journal Volume XXIV Special Issue 5, p. 709-725.
3. Sławińska M., Derbich M., Ewertowski T., Król I., Berlik M., (2019), Skuteczność zarządzania operacyjnego na podstawie bazy informacji eksploatacyjnej, Zeszyty Naukowe Politechniki Poznańskiej. Organizacja i Zarządzanie, nr 80, s. 235-251.
4. Sławińska M., (2019), Ergonomic engineering of technological devices, Wydawnictwo Politechniki Poznańskiej, 129 s.
5. Szopa T., (2016), Niezawodność i bezpieczeństwo, Oficyna Wydawnicza Politechniki Poznańskiej, Warszawa.
6. Sławińska M., Modeling Ecologic Processes of Production, (2016), Research in Logistics & Production, Vol. 6 No.3, pp. 217-229, DOI: 10.21008/j.2083-4950.2016.6.3.3 (Published 0nline: 16 July 2016).
7. Kępka P. (2015), Projektowanie systemów bezpieczeństwa, BEL Studio, Warszawa, ISBN: 978-83-7798-232-7.
8. Sławińska M., Mrugalska B., Information quality for health and safety management systems: A case study, (2015, [in]: Occupationnal Safety and Hygiene III, Edited by Pedro M. Arezes et al. (eds), Taylor & Francis Group, London), p. 29-32, ISBN 978-1-138-02765-7.
10. Sławińska M., Butlewski M., Podsystem ergonomiczny jako zasób informacji eksploatacyjnej maszyn, Zarządzanie Przedsiębiorstwem, Nr 3 (2014), s. 34-39, ISSN 1643-4773.
11. Sławińska M., Niezawodność człowieka w interakcji z procesem przemysłowym, (2012), Wyd. Politechniki Poznańskiej, Poznań, ISBN 978-83-7775-178-7.

Additional:
1. Sławińska M., Reengineering ergonomiczny procesów eksploatacji zautomatyzowanych urządzeń technologicznych (ZUT), (2011), Rozprawy Nr 462, Wyd. Politechniki Poznańskiej, Poznań, ISSN 0551-6528, ISBN 978-83-7775-100-8.
2. Będkowski L., Dąbrowski T., (2006), Podstawy eksploatacji, część II, Podstawy niezawodności eksploatacyjnej, Wydawnictwo Wojskowej Akademii Technicznej, Warszawa.
3. PN-ISO 45001:2018-06, Systemy zarządzania bezpieczeństwem i higieną pracy. Wymagania i wytyczne stosowania, PKN, Warszawa.
4. Ignac-Nowicka J., Rozwój techniki sensorowej jako inteligentna specjalizacja w inżynierii bezpieczeństwa, Systemy Wspomagania w Inżynierii Produkcji, 2016 - yadda.icm.edu.pl http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-12d4cfc3-39ac-4e66-bdc9-168cfad7aae6
5. Gembalska-Kwiecień A., Narzędzia wspierające rozwój innowacyjnych rozwiązań w inżynierii bezpieczeństwa http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-bc776a49-e0d9-4907-b975-3abc25224eaf
6. Siudak K. , Smal T., Bezpieczeństwo techniczne w przedsiębiorstwie produkcyjnym https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-3309bf19-2035-4a78-8339-946b149714c3

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00