COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technical safety engineering [N1IBiJ1>IBT]

Course

Field of study
Safety and Quality Engineering

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
9

Laboratory classes
0

Other
0

Tutorials
9

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr hab. inż. Małgorzata Sławińska prof. PP
malgorzata.slawinska@put.poznan.pl

Lecturers

Prerequisites

When starting this subject, the student should have basic knowledge of technology, technical machine drawing and work safety management. He should also have the ability to use various sources of information, be able to describe system relations, have the ability to independently propose solutions to a specific problem and carry out the procedure of making decisions in this area.

Course objective

Provide students with theoretical and practical knowledge related to the assessment and development of the level of security that should be ensured by technical measures used in the implementation of basic technological operations. Developing the ability to analyze the causes of safety failure and the ability to design safety control mechanisms of technical and social systems.

Course-related learning outcomes

Knowledge:
1. The student has advanced knowledge of technical safety systems, including occupational health and safety rules, and understands how these systems prevent threats and minimize their effects [K1_W02].
2. The student has advanced knowledge of issues related to the identification, analysis and assessment

of risk in the context of technical security [K1_W03].
3. The student has advanced knowledge of the life cycle of technical systems and systems [K1_W06].

Skills:
1. The student is able to properly select sources and information derived from them in order to evaluate, critically analyze and synthesize this information [K1_U01].
2. The student is able to critically analyze and optimize existing technical solutions [K1_U06].
3. The student is able to take part in a debate and present the problem of technical security using appropriately selected means [K1_U09].
4. The student is able to identify changes in requirements, standards, regulations, technical progress and the reality of the labor market, and on their basis determine the need to supplement knowledge [K1_U12].

Social competences:
1. The student is able to notice cause-and-effect relationships in the implementation of set goals and use ranks in relation to the importance of alternative or competing tasks [K1_K01].
2. The student is aware of the importance of knowledge in solving problems in the field of technical security and continuous improvement [K1_K02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
- exercises: evaluation of reports from performed exercises and evaluation of tasks to be performed by oneself,
- project: assessment of progress in the implementation of the project task (compliance with the adopted schedule for the project task) and activity during the classes,
Summative assessment:
- exercises: average of the marks for the prepared reports,
- project: assessment of the completed project, including the assessment of progress in the implementation of the project task and activity in classes during the implementation of the project task,
- lecture: written test in the form of a test in which at least one answer is correct (the answer is scored in the range of 0 to 10) or answers to open questions (answers are scored on a scale from 0 to 100); a student receives a credit after reaching at least 51% of the possible points.

Programme content

The program covers the basics of technical safety engineering in terms of selected failure models and design methodology for accident prevention mechanisms.

Course topics

The lecture program covers the following topics:
Failure models. Controlling the safety of systems;
Reliability structure of the system;
Technical system readiness;
Programs to prevent accidents;
Modern approaches to the role of the operator of machinery and technical equipment;
Ergonomic engineering;
Process diagnostics and its basic tasks.

Exercises include the performance of tasks for credit in the following topics:
Elements of the safety system performing active safety, passive safety and post-accident safety tasks;
Measures of system readiness;
Expenditures incurred for technical safety vs. the cost of damage caused by accidents and failures;
Objectives of process diagnostics.

The student designs system relationships for an accident prevention program using knowledge from the following areas:

Modern safety devices;
Functional characteristics of machinery and technical equipment;
Mechanisms of damage caused by technical facilities;
Accident prevention programs;
General description of the diagnosis object including damage, industrial applications.

Teaching methods

- lecture: a seminar lecture
- exercises: the method of expert tables interchangeably with the method of cases
- project: multi-stage cognitive task

Bibliography

Basic:
1. Polskie normy z zakresu bezpieczeństwa pracy, ergonomii i systemów zarządzania bezpieczeństwem pracy (SZBP)
2. Wybrane problemy bezpieczeństwa pracy, ergonomii I ochrony środowiska, Jerzy S. Marcinkowski (red.), Wyd. Pressmedial, Lubin, 2011
3. Sławińska M., (2012), Niezawodność człowieka w interakcji z procesem przemysłowym, WPP, Poznań.
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

Additional:
1. Elementy eksploatacji obiektów technicznych, Niziński S., Wyd. Uniwersytetu Warmińsko-Mazurskiego, Olsztyn, 2000
2. 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
3. Siudak K. , Smal T., Bezpieczeństwo techniczne w przedsiębiorstwie produkcyjnym https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-3309bf19-2035-4a78-8339-946b149714c3
4. Górny A., Sławińska M., Sobczak W. (2016), Ocena kompetencji jako narzędzie zapewnienia bezpieczeństwa w przedsiębiorstwie budowalnym, Finanse, Rynki Finansowe, Ubezpieczenia, nr 5 (83/2), ss. 109-119. http://www.wneiz.pl/nauka_wneiz/frfu/83-2016/FRFU-83-cz2-109.pdf http://www.wneiz.pl/frfu/numery/rok2016/frfu-nr-5-2016-czesc-2

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	21	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	54	2,50