



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical safety engineering

Course

Field of study

Safety Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

30

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

Ph.D., D.Sc., Eng. Małgorzata Sławińska,
University Professor

Responsible for the course/lecturer:

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Faculty of Engineering Management

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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 knows in depth the issues of technical safety, safety systems, occupational health and safety as well as threats and their effects [K1_W02]
2. The student has advanced knowledge of the risks and their effects, risk assessment in the work environment as well as occupational accidents and diseases [K1_W03]
3. The student has advanced knowledge of the life cycle of products, devices, facilities, systems and technical systems [K1_W06]
4. The student knows the issues of management and organization as well as marketing and logistics in the context of security engineering [K1_W08]
5. The student knows the fundamental dilemmas of modern civilization and development trends as well as the best practices in the field of security engineering [K1_W10]

Skills

1. The student is able to properly select the sources and information derived from them, making the assessment, critical analysis and synthesis of this information [K1_U01]
2. The student is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks, also with the use of information and communication methods and tools [K1_U04]
3. The student is able to make a critical analysis of the functioning method and evaluate, in connection with Safety Engineering, the existing technical solutions, in particular machines, devices, objects, systems, processes and services [K1_U06]
4. The student is able to take part in the debate, to present the problem within the framework of safety engineering using properly selected means [K1_U09]
5. The student is able to identify changes in the requirements, standards, regulations and technical progress and the reality of the labor market, and on their basis define the need for supplementing knowledge [K1_U12]

Social competences

1. The student is able to see the cause-and-effect relationships in the implementation of the set goals and use the ranks in relation to the significance of alternative or competitive tasks [K1_K01]



2. The student is aware of the recognition of the importance of knowledge in solving problems in the field of safety engineering and continuous improvement [K1_K02]
3. The student is aware of the understanding of non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions [K1_K03]
4. The student is aware of the responsibility for their own work and readiness to submit to the rules of teamwork and responsibility for jointly performed tasks [K1_K07]

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 written 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

- lecture: The Essence of Technical Safety Engineering. Modern security devices. Basics of managing the operation of machinery and technical devices. Concepts of security of technical and social systems. Failure models. System safety control. System reliability structure. Technical system readiness. Accident prevention programs. A modern approach to the role of an operator of machines and technical devices. Ergonomic engineering. Process diagnostics and its basic tasks.
- exercises: Relating various disciplines of knowledge with the theory of security. Mechanical hazards. Assessment of technical means for the implementation of selected technologies, made for the purpose of assessing the level of safety during operational works and maintenance works. Elements of the safety system that perform tasks in the field of active safety, passive safety and accident safety. System readiness measures. Expenses incurred on technical safety and costs of damages caused by accidents and failures. Process diagnostics objectives.
- project: The role of safety engineering in shaping the progress and development of technology. Modern security devices. Functional features of machines and technical devices. Assessment of work



organization solutions in terms of their impact on technical safety. Damage mechanisms caused by technical objects. Accident prevention programs. General description of the diagnosed object, including damages, 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
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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 budowlanym, Finanse, Rynki Finansowe, Ubezpieczenia, nr 5 (83/2), ss. 109–119.
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<http://www.wneiz.pl/frfu/numery/rok2016/frfu-nr-5-2016-czesc-2>

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	60	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	65	2,0

¹ delete or add other activities as appropriate