

## SYLLABUS

**Name: Safety engineering in the work environment (PBL)**

**Name in Polish:**

**Name in English:**

### Information on course:

**Course offered by department:** Faculty of Organisation and Management

**Course for department:** Silesian University of Technology

**Study level and form:** Bachelor's degree, Full-time

**Term:** winter semester 6, 2025/2026

**Coordinator of course edition:** .....

### Default type of course examination report:

EGZ

### Language:

English

### Course homepage:

<https://platforma.polsl.pl/roz/>

### ECTS

6

### Short description:

The aim of the course is to familiarize students with the basic concepts and essence of safety engineering used in the work environment. Presentation of topics including the functioning of a technical facility in cooperation with humans and the circumstances of threats requiring monitoring. Acquiring the ability to select and construct simple safety systems operating in the work area, understanding the principles of their operation and the principles of operation of their basic elements. Ability to create concepts for work zone security projects using knowledge of safety engineering.

### Description:

Program content:

Lecture: 15 h

1. The essence of occupational safety engineering - basic concepts and connections with other disciplines.
2. The concept of occupational safety engineering in relation to a technical facility.
3. Functioning of a technical facility in the process of its operation by the operator.
4. Methodology for constructing a fault tree of a technical object - identification of human and machine errors.
5. Construction of basic work safety systems in the work environment.
6. The use of sensors in occupational safety systems.
7. Application of occupational safety systems in industrial plants - examples.

Laboratory: 15 h

1. Analysis of sensors used in gas safety
2. Work safety engineering in machine movement.
3. Construction of workspace supervision systems at workplaces.
4. Programming workspace security devices using the example of an infrared barrier.
5. Presentation (paper) of a selected occupational safety system from the given topics - group work.

Project: 30 h

1. Phases of designing security systems.
2. Analysis of threats and weak points of the facility
3. Creating a project concept.
4. Creating a security system configuration.
5. Analysis of safety systems in machine traffic.
6. Analysis of weak points and threats in the work zone.
7. Construction of work zone protection systems.
8. Creating a simple design of a safety system operating in the work area - group consultations.

Forms of conducting classes, along with the number of teaching hours:

Lecture: 15 hours

Laboratory: 15h

Project: 30 hours

Number of hours devoted to student's own work:

- preparation of the exercise task: 30/1

- project development: 30/1

- exam preparation: 60/2

Number of teaching hours and number of ECTS points in classes with direct participation of academic teachers or other people conducting classes: 60/2

#### **Bibliography:**

1. J. Ignac-Nowicka, „Inżynieria bezpieczeństwa. Wybrane zagadnienia”, Wyd. Pol. Śl. Gliwice 2018.
2. K. Chrużik, „Inżynieria bezpieczeństwa w transporcie”, Wyd. Pol. Śl. Gliwice 2016.
3. A. Wójcik, „Mechaniczne i elektroniczne systemy zabezpieczeń. Literatura fachowa dla firm i instytucji”, Wyd. Verlag Dashofer, Warszawa 2004.
4. J. Ignac-Nowicka, „Rozwój techniki sensorowej jako inteligentna specjalizacja w inżynierii bezpieczeństwa”, w: Systemy Wspomagania w Inżynierii Produkcji. Metody i narzędzia inżynierii produkcji dla rozwoju inteligentnych specjalizacji, vol. 4, 2016. (dostępne online)
5. J. Ignac-Nowicka, „Zastosowanie sensorów w inżynierii bezpieczeństwa dla rozwoju inteligentnej specjalizacji”, w: Górka M., Staniewska E., (red.): Bezpieczeństwo jako determinanta doskonalenia systemu zarządzania organizacjami. Wyd. Wydziału Inżynierii Produkcji i Technologii Materiałów Politechniki Częstochowskiej, Częstochowa 2016.
6. J. Ignac-Nowicka, Analiza zagrożeń na wybranych stanowiskach pracy z zastosowaniem drzewa błędów, Systemy Wspomagania w Inżynierii Produkcji, tytuł zeszytu: Jakość, bezpieczeństwo, środowisko. Red.: Artur Kuboszek, Elżbieta Milewska, 2017 vol. 6 iss. 7, s. 97-104.
7. Industry magazines, bimonthly entitled "Security" - available on the website

#### **Learning outcomes:**

K1A\_W3 the student knows and understands the basic engineering processes and technologies occurring in the life cycle of devices, objects and technical systems as well as methods of solving typical engineering tasks, in particular in relation to safety engineering in the work environment.

K1A\_W7 the student knows and understands the fundamental problems of modern civilization relevant to management and production engineering, in particular in the area of safety engineering used in the work environment.

K1A\_U5 student is able to make a critical analysis of the functioning of existing technical and technological solutions in safety systems function, evaluate these solutions and suggest appropriate improvements and innovations in this regard.

K1A\_U6 student is able to designs - in accordance with given specifications - new and supervises existing facilities, processes and production and operational systems in terms of safety, using appropriate methods, techniques, tools and materials.

K1A\_U7 student is able to work individually and in a team, taking on various roles, planning and organizing this work, as well as interacting with other people as part of teamwork (also of an interdisciplinary nature) using specialized terminology in the field of security engineering and modern information and communication technologies, as well as take part in the debate.

K1A\_K1 student is ready for critically assessing knowledge and content received, recognizing the importance of knowledge in solving cognitive and practical problems, and consulting experts in case of difficulties in independently solving safety engineering problems.

#### **Assessment methods and assessment criteria:**

Conditions for passing the course: preparing and presenting a report on laboratory classes, completing a written project and passing a written exam on lecture content.

The final grade is 50% of the exam grade (lecture content) and 50% of the average grade from the laboratory and project.

#### **Practical placement:**