



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modeling of requirements for safety systems

### Course

Field of study

Safety Engineering

Area of study (specialization)

Integrated Management of Safety in Organization

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

Other (e.g. online)

Tutorials

10

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

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Faculty of Engineering Management

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Responsible for the course/lecturer:

### Prerequisites



The student has a basic knowledge of safety. He knows the selected safety systems. Understands system dependencies in organizations.

### Course objective

Strengthening knowledge and acquiring skills in creating models of safety hazards' situations. Acquisition of competences necessary to develop and organize safety management systems in the organization.

### Course-related learning outcomes

#### Knowledge

1. A student knows issues related to the area of ergonomics and occupational safety [P7S\_WG\_03],
2. A student knows design issues in relation to products and processes [P7S\_WG\_07],
3. A student knows contemporary development trends and best practices in the field of safety systems [P7S\_WK\_02],
4. A student knows the basic methods, techniques, tools and materials used to solve simple engineering tasks in the field of ergonomics and work safety using information technologies, information protection and computer support [P7S\_WK\_03],

#### Skills

1. A student is able to properly select the sources and information derived from them, make an assessment, critically analyze and synthesize this information, formulate conclusions and comprehensively justify the opinion [P7S\_UW\_01],
2. A student can use various techniques to communicate in a professional environment and in other environments, also in a foreign language [P7S\_UW\_02],
3. A student is able to see and formulate systemic and non-technical as well as socio-technical, organizational and economic aspects in engineering tasks [P7S\_UW\_03],
4. A student is able to use research, analytical, simulation and experimental methods to formulate and solve engineering tasks, also using information and communication methods and tools [P7S\_UW\_04],
5. A student is able to perform a critical analysis of the way it functions and assess - in conjunction with Safety Engineering, existing technical solutions, in particular machines, devices, objects, systems, processes and services [P7S\_UW\_06],

#### Social competences

1. A student is aware of the recognition of cause-and-effect relationships in achieving the set goals and ranking the importance of alternative or competitive tasks [P7S\_KK\_01],
2. A student is aware of responsibility for own work and readiness to comply with the rules of teamwork and taking responsibility for jointly implemented tasks [P7S\_KR\_02].



## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

- a) tutorials: current assessment (on a scale of 2 to 5) of the tasks assigned,
- b) lectures: presence and activity on lectures (partial points).

Summative rating:

- a) tutorials: average of partial tasks; credit after passing at least 3.0,
- b) lectures: Exam test. The test consists of 15 to 20 questions (test and / or open), variously scored.

Passing threshold: 55% of points recalculated and scored on a scale of grades from 2 to 5; partial points may increase the final grade).

## Programme content

Lecture: Outline of systems theory. Characteristics of the modeling process. Hazards in the work and life environment. Models of accidents and incidents. Simple sequential / linear models eg Hienrich's domino theory, Root Cause Analysis (RCA), Fault Tree Analysis (FTA), Cause and Effect Analysis. Epidemiological models / complex linear models eg Reason's Model, SHELL, TRIPOD, MORT, HFACS. System / dynamic models, eg Accimap, STAMP and FRAM. Modeling an accident using energy transfer. Modeling an accident using the method of analysis of changes. Models of events and causal factors. Models used in safety management systems. Determining the requirements for the safety system for a given map of safety hazards in the area of its responsibility.

The aim of the exercises is to solve cognitive tasks that allow to apply and develop in practice the knowledge acquired during the lectures.

## Teaching methods

Lecture: information and conversation lecture based on multimedia presentation.

Tutorials: situation method in conjunction with case study analysis.

## Bibliography

Basic

1. Kołodziński E. (ed.) (2015), Modeling in safety engineering, Publishing House of the Military University of Technology, Warsaw.
2. Sienkiewicz P. (2015), Security systems engineering, Polskie Wydawnictwo Naukowe, Warsaw.
3. Klich E. (2011). Flight Safety, Scientific Publisher of the Institute of Sustainable Technologies, National Research Institute, Radom.
4. Ficoń K. (2007), Crisis management engineering, Wydawnictwo BEL Studio Sp. Z.o.o, Warsaw

Additional

1. Szymonik A. (2011), Organization and functioning of security systems. Security management, Difin Publishing House, Warsaw.
2. Kępką P. (2015), Design of security systems, BEL Studio Sp. z o.o., Warsaw.



3. Zawila- Niedwiecki J. (2013), Operational risk management in ensuring business continuity of the organization's activity, Edu-Libri Publishing House, Kraków.
4. Legal regulations and standards relating to the issues discussed.
5. Ewertowski T. Nowakowski M., Zieja M., Żyluk A. (2016), Study of the participation of the human factor using the developed model of the taxonomy of the causes of air incidents, Buses: technology, operation, transport systems No. 12 pp. 339-347.
6. Sławińska M., Derbich M., Ewertowski T., Król I., Berlik M., (2019) Effectiveness of operational management based on the operational information base, Scientific Papers of the Poznań University of Technology. Series: Organization and Management, 80, 235-251.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	55	2,0

<sup>1</sup> delete or add other activities as appropriate