COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modeling requirements for safety systems

Course

Field of study
Safety Engineering
Area of study (specialization)
Ergonomics and work safety
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
2/3
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture
15
Laboratory classes
0
Other (e.g. online)
0
Tutorials
15
Projects/seminars
0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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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

- knows issues related to the area of ergonomics and occupational safety (P7S_WG_03),

- knows design issues in relation to products and processes (P7S_WG_07),

- knows contemporary development trends and best practices in the field of safety systems (P7S_WK_02),

- 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

- 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),

- can use various techniques to communicate in a professional environment and in other environments, also in a foreign language (P7S_UW_02),

- 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),

- 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),

- is able to prepare the necessary resources to work in an industrial environment and knows the safety rules associated with this work and is able to force their application in practice (P7S_UW_05),

- 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

- 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),

- 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:
- tutorials: assessment of reports on exercises performed and tasks to be carried out by own,
- lecture: written test carried out after fourth lectures.

Summary assessment:
- tutorials: mean of the marks for the preparation of the reports.
- lecture: Lectures end with an exam covering knowledge of the issues presented in the lecture.

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. Kępka P. (2015), Design of security systems, BEL Studio Sp. z o.o., Warsaw.
3. Zawiła- 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	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate