

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Engineering of technical safety</b>		Code <b>1011101151011123015</b>
Field of study <b>Safety Engineering - Full-time studies - First-</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>15</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Małgorzata Sławińska email: malgorzata.slawinska@put.poznan.pl tel. 665-3438 Faculty of Engineering Management ul. Strzelecka 11 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Student has an ordered, theoretically supported, general knowledge which covers the key issues within the scope of the studied discipline
2	<b>Skills</b>	The student has the ability to independently propose solutions to a particular problem and carry out procedures in order to take up decisions in this regard
3	<b>Social competencies</b>	The student is able to independently and critically deepen the knowledge and skills that are extended into an interdisciplinary dimension
<b>Assumptions and objectives of the course:</b> Understanding the theoretical and practical issues relating to the assessment and development of the safety level, which should be provided by the technical means used in the process of implementing technological operations. Acquiring skills necessary for conducting an analysis which aims at finding reasons for safety unreliability, as well as skills for designing the safety control system mechanisms .		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Student has orderly, theoretically supported general knowledge of technical security - [K1A_W08] 2. The student knows current development trends and best practices in the area of technology and normalization - [K1A_W15] 3. The student has a basic knowledge of products, equipment, objects and technical systems - [K1A_W19] 4. The student knows concepts connected with reliability and safety of technical equipment, objects and technical systems exploitation - [K1A_W20] 5. Knows methods of risk assessment, threats modelling, actions that are taken in the face of threats and accidents, assessment methodology of accidents criticality, determining the cause of accidents in working environment and/or human life and health and safety costs - [K1A_W21] 6. The student has a basic knowledge to understand social and legal conditions of engineering activity - [K1A_W27]		
<b>Skills:</b>		

1. The student can acquire, integrate, interpret data from literature, database or other properly matched sources, both in English or other foreign language accepted as an international language of communication within Safety Engineering, as well as to draw conclusions, formulate and justify opinions - [K2A\_U01]
2. The student can create, both in English and Polish language, a well- documented report of problems within Safety Engineering, which present the results of their own research - [K2A\_U03]
3. The student has self-study ability and comprehends it - [K2A\_U05]
4. The student can analyse the undertaken engineering activities in terms of economics - [K1A\_U12]
5. The student can estimate and scrutinize existing technical solutions, particularly machines, equipment, objects, systems, processes and services, in connection with Safety Engineering - [K1A\_U13]
6. The student can design simple equipment, object, system, services and technological processes that are typical of Safety Engineering - [K1A\_U16]

**Social competencies:**

1. The student understands the need and knows means how to self-study ( first, second and third cycle studies, postgraduate studies, qualification courses)- improving professional, personal and social competence; can argue the need to learn for the whole life - [K1A\_K01]
2. The student is aware of importance and consequences of engineering activity, its impact on an environment, responsibility for taken decisions - [K1A\_K02]
3. Student is fully aware of the responsibility that he has taken for his own work and expresses readiness to comply with the rules of team work as well as takes responsibility for mutually realized and completed tasks - [K1A\_K03]
4. The student can determine some causal relationships in the process of targets implementation and rank pertinence of alternative or competitive tasks - [K1A\_K04]

**Assessment methods of study outcomes**

Formative assessment:

Classes: on the basis of a written problem task,

Projects: on the basis of a written report that contains gradual development stages in a system analysis of safety conditions of a selected organizational unit,

Lectures: on the basis of oral answers of the questions connected with the covered lecture content from current and previous lectures.

Collective assessment:

Classes: average of the grades achieved during classes,

Projects: collective assessment of the project and presentation,

Lectures: written test, which is based on 50% answers related to the selection of given answers and open questions. Credits will be given after achieving at least 31% of points. Answers are scores as 0, 0,5 or 1

**Course description**

The essence of the technical and civil safety engineering. Models of safety systems. The cause of the damage. Mechanisms of damage formation caused by technical objects. Estimating the chance occurrence of probability of events. Evaluation of technical measures that are used for implementation of selected technologies, applied in order to assess the level of safety in operation work and the work of technical service. Assessment of the solutions in a work organisation and their impact on technical safety. Technical means to ensure the technical safety of people with disabilities (locomotive, visual, hearing related, , intellectual). Economic and social aspects of technical safety. Expenditure incurred for technical safety and the cost of damage caused by accidents and failures. The role of safety engineering in the progress and development of technology. Managing operations within the scope of the technical safety.

**Basic bibliography:**

1. Poradnik BHP. Tom I: Praktyka, prawo, narzędzia (A Guide For Health And Safety At Work. Volume I: practice, law, tools), Kołodziejczyk E. (red.), Wyd. Forum, sp. z o.o. , Warszawa, 2005
2. Ryzyko zawodowe na stanowisku pracy. Część I. Ergonomiczne czynniki ryzyka (Occupational risk in the workplace. Part i. Ergonomic risk factors), Horst W., Wyd. Politechniki Poznańskiej , Poznań, 2004
3. Systemy zarządzania bezpieczeństwem w przedsiębiorstwie (Safety management systems in an enterprise), Ciecierska B. i inni, Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów, 2006

**Additional bibliography:**

1. Elementy eksploatacji obiektów technicznych (Exploitation elements of technical objects), Niziński S., Wyd. Uniwersytetu Warmińsko-Mazurskiego, Olsztyn, 2000
2. Niezawodność człowieka w interakcji z procesem przemysłowym (Human reliability in interaction with the industrial process), Sławińska M., WPP, Poznań 2012
3. Zarządzanie bezpieczeństwem pracy w przedsiębiorstwie (Occupational safety management in an enterprise), Lewandowski J. Wyd. Politechniki Łódzkiej, Łódź, 2000

**Result of average student's workload**

<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in lectures	15	
2. Participation in classes	15	
3. Participation in project classes	15	
4. Preparation for classes	15	
5. Preparation for project tasks	13	
6. Preparation for written credits (based on lectures)	13	
7. Overview of results (lectures)	2	
8. Overview of results (classes)	2	
9. Presentation of the semester project	2	
10. Consultation	10	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	102	4
Contact hours	51	2
Practical activities	52	2