



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Certification of machines and devices

### Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

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### Prerequisites

Basics of engineering calculations in the field of technical mechanics and material strength, as well as computer-aided engineering. Ability to acquire knowledge on the basis of resources: library, internet (including e-resources).

### Course objective

Acquiring knowledge and skills by students in the field of proper acceptance of machines, proper marketing of machines and proper operation of machines for the proper functioning of production companies.



### Course-related learning outcomes

#### Knowledge

1. Has a basic knowledge of engineering calculations in the area of technical mechanics and strength of materials- [K\_W05].
2. Has detailed knowledge of engineering graphics. It includes projection, sections, dimensioning, part drawings, assembly drawings, diagrams and markings. He knows engineering databases and computer aided design (CAD) programs - [K\_W07].
3. Has detailed knowledge of quality management and the life cycle of technical devices and related reliability aspects- [K\_W20]

#### Skills

1. Can interpret technical drawing. Can use CAD computer programs to make a drawing of a part and an assembly drawing- [K\_U09].
2. Is able to perform a strength analysis of the basic parts of machines and devices (beams, shafts, axles), performing the necessary strength calculations- [K\_U07].
3. Can develop design assumptions (functional diagram based on the theory of mechanisms) of a technical device. Is able to assess the structure, indicate the possibility of variants of solutions and optimization of the structure- [K\_U08].

#### Social competences

1. Can work with various environments using computer networks and multimedia techniques- [K\_K12].
2. Is able to define priorities related to activities in the field of production preparation. Understands technical and non-technical conditions of the technology used- [K\_K02].
3. Understands technical and non-technical aspects related to the development of the structure in terms of the impact of the device on the society and the environment. He sees his responsibility for decisions made in the construction process- [K\_K03].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Exam / credit in case of correct answer to min. 2 questions from 4 questions: <2 ndst, 3 dst, 3.5 dst +, 4 db, 4.5 db +, 5 bdb), carried out at the end of the semester. The condition for obtaining a credit in the course is also obtaining a positive grade in the laboratory classes.

Laboratory: Completion of the laboratory.

### Programme content

Lectures:

Lecture 1 - Legal conditions for the safety of machines and devices



Reference to legal acts determining the provisions of occupational safety and health protection with particular attention to the provisions referring to machines, i.e. the Machinery Directive 2006/42 / EC and the Tool Directive 2009/104 / EC, and the Act of April 13, 2016 on conformity assessment systems and market surveillance.

#### Lecture 2 - Basic terminology

Presentation of basic concepts, including essential and minimum requirements, machine, partly completed machine, set of machines (combined machine), modernization, modification, risk assessment, harmonized standard, placing on the market, death certificate

#### Lecture 3 - Scope of application of the Machinery Directive 2006/42 / EC and the Tool Directive 2009/104 / EC

The scope of application of the Machinery Directive 2006/42 / EC and Directive 2009/104 / EC will be discussed, with a detailed graph showing the dates of implementation of these provisions into Polish law.

#### Lecture 4 - Analysis of the threats created (technical risk assessment)

The most frequently used methods of technical risk assessment will be presented (including the three-stage method, FMEA), also the method compliant with the PN EN ISO 12100: 2012 standard and the risk reduction strategy.

#### Lecture 5 - Principles of comprehensive security

Will be discussed, among others. the principle of comprehensive safety, the three-stage method, methods of preventing use deviating from normal use, basic principles of ergonomics, operator's position in hazardous environments.

#### Lecture 6 - Machine manual and technical and construction documentation for the machine

The scope of the manual and the method of preparing technical and construction documentation will be discussed in detail.

#### Lecture 7 - Declaration of conformity for machines

The content of the EC declaration of conformity, the content of the declaration of incorporation of the partly completed machine, the requirements for storing the declaration and the content of the certificate of operation will be discussed.

#### Lecture 8 - Form of CE marking and methods of market surveillance

The model of CE marking and examples of correct and incorrect CE marking will be discussed and presented. The methods of market surveillance will also be discussed, with an indication of the institutions that can perform the inspections of production plants.



**Laboratories:**

Laboratory 1 - Analysis of legal regulations for a selected machine or device

Analysis of the applicable legal provisions in terms of their selection for the selected machine, device.

Laboratory 2 - Preparation of a user manual for the selected machine or device

Preparation of a user manual for the selected machine or device.

Laboratory 3 - Preparation of a manual for the selected machine or device - continued.

Completing the manual for the selected machine or device.

Laboratory 4 - Technical risk assessment for the selected machine

Choosing the appropriate method and carrying out a technical risk assessment for the selected machine.

Laboratory 5 - Technical risk assessment for the selected machine - continued.

Completing the technical risk assessment and attempting to minimize it.

Laboratory 6 - Preparation of the EC declaration of conformity for the selected machine

Preparation of the EC declaration of conformity for the selected machine.

Laboratory 7 - Review of technical and construction documentation for the purposes of control and assessment

List and review of the documentation prepared for the purposes of control by supervisory authorities, including National Labor Inspectorate. Summary of issues and completion of laboratories.

Laboratory 8 - Summary and final classes

Discussion of the results of laboratory reports. Evaluation of the subject.

**Teaching methods**

Lecture: multimedia presentation illustrated with examples.

Laboratory: Laboratory exercises, solving practical problems, searching for sources, working in a team, discussion

**Bibliography**

Basic

1. Gawlik J., Kiełbus A.: Metody i narzędzia w analizie jakości wyrobów. Politechnika Krakowska, Kraków 2008, s.79-92.

2. Machinery Directive 2006/42/WE



3. Regulation of the Minister of Economy of October 21, 2008 on essential requirements for machines

Additional

1. Samek A.: Współpraca specjalistów w procesie projektowania. Przegląd Mechaniczny 3/2008, s.16-19
2. Guide to the application of Directive 2006/42 / EC on machinery, 2nd edition, June 2010.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	30	1,0

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