



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Introduction to Engineering [S1IBiJ1>WdT]

### Course

Field of study

Safety and Quality Engineering

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

dr hab. inż. Marcin Butlewski prof. PP  
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### Lecturers

### Prerequisites

Knowledge of high school mathematics and physics. Ability to solve simple tasks in the field of mathematics and physics.

### Course objective

Familiarizing students with the basic problems related to the development of technology, making them aware of the logic of changes in manufacturing techniques and the relationship between man and technology and the environment. The systemic nature of these relationships is emphasized. Acquainting students with modern trends in the development of techniques and technologies as well as the organization of human work is aimed at developing the practical ability to identify, understand and describe modern manufacturing techniques used in machine construction.

### Course-related learning outcomes

Knowledge:

1. Defines key moments in the history of technology and their impact on the evolution of society and human development [K1\_W02].
2. Describes the main techniques and technologies used in material processing, including plastic

deformation, casting, machining, and heat and thermochemical treatment [K1\_W06].

3. Explains the principles of operation and construction of basic machine subassemblies, such as bearings, transmissions, clutches, and brakes [K1\_W11].

4. Characterizes different techniques and technologies related to energy, including sources, methods of transmission, and transformation [K1\_W10].

5. Identifies and describes various aspects of technology in the context of contemporary civilizational problems and ethical dilemmas of creators and users of technology [K1\_W11].

Skills:

1. Analyzes and evaluates various sources of information regarding techniques and technologies, using acquired knowledge for critical analysis and synthesis [K1\_U01].

2. Uses analytical, simulation, and experimental methods to formulate and solve simple engineering tasks using information technologies [K1\_U04].

3. Conducts a systemic analysis of given engineering problems, considering socio-technical, organizational, and economic aspects [K1\_U03].

4. Designs technical solutions, guided by the principles of quality and safety, and optimizes existing solutions to improve their efficiency [K1\_U07].

Social competences:

1. Develops awareness of the importance of continuous improvement of knowledge in the field of technology and safety engineering as a key element of personal and professional development [K1\_K02].

2. Shapes responsibility for the impact of engineering activity on the environment and society, understanding the consequences of technological decisions [K1\_K03].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) in the field of exercises: current checking of knowledge and skills during accounting and graphic exercises,

b) in the field of lectures: on the basis of a discussion on the material assimilated at previous lectures;

Summative assessment:

a) in the field of exercises: on the basis of the results of the average of partial grades of the forming assessment

b) in the field of lectures: examination in the form of a written test.

### Programme content

Elements of the history of engineering with the background of human evolution and the development of societies. Techniques and technologies relating to materials (including metal working, casting, machining, heat and thermo-chemical treatment). Connections used in machine construction, principles of construction and operation of machine components (bearings, gears, clutches, brakes). Techniques and technologies relating to energy (sources, methods of transmission and transformation). Information techniques and technologies. Techniques and technologies in various fields of human activity. Technology and human work. Selected problems of contemporary technical civilization. Ethical problems of the user and the creator of the engineering.

### Course topics

- Elements of the history of technology against the background of human evolution and the development of societies
- Techniques and technologies relating to materials (e.g. forming, casting, machining, heat and thermo-chemical treatment)
- Connections used in mechanical engineering
- Principles of construction and functioning of machine components (bearings, gears, couplings, brakes)
- Energy techniques and technology (sources, transmission and transformation)
- Information techniques and technologies
- Techniques and technologies in various fields of human activity
- Technology and human labour

- Selected problems of contemporary technical civilisation
- Ethical problems of the user and creator of technology
- History of inventions and their impact on the development of societies
- Development of technology in different historical periods
- Key figures in the history of technology and their achievements
- Impact of the Industrial Revolution on technology and society
- Technological innovations in the 20th and 21st century
- The impact of technology in shaping the modern world
- Interaction between technology and culture
- Sustainable development in a technological context
- Changes in production techniques and their impact on the labour market
- Automation and robotisation in industry
- The role of research and development in technological progress
- Challenges of technology in the context of globalisation
- Intellectual property protection in technology
- Technology and environmental protection
- Technological safety and its importance for society

### Teaching methods

Lectures with a multimedia presentation. Accounting and design exercises related to topics related to the lectures.

### Bibliography

Basic:

1. Introduction to technology, Edwin Tytyk, Marcin Butlewski, Wyd. Poznań University of Technology, Poznań, 2008
2. Introduction to the technique - materials for exercises and lectures, Zbigniew Tomaszewski, Wyd. Poznań University of Technology, Poznań, 2002
3. Encyclopedia of manufacturing techniques used in the machinery industry, Volume I, Jerzy Erbel (ed.), Oficyna Wydawnicza Politechniki Warszawskiej, Warsaw, 2001
4. Encyclopedia of manufacturing techniques used in the machinery industry, Volume II, Jerzy Erbel (ed.), Oficyna Wydawnicza Politechniki Warszawskiej, Warsaw, 2001

Additional:

1. Machine technology, Stefan Okoniewski, WSiP, Warsaw, 1999
2. The universal history of technology, Bolesław Orłowski, Oficyna Wydawnicza Talks Wieki, Warsaw, 2010
3. Ancient inventions, Peter James, Nick Thorpe, Świat Książki, Warsaw, 1997
4. Butlewski, M. (2012). The issue of product safety in contemporary design. Safety of the System, Technical, Organizational and Human Work Safety Determinants. Ed. Simon Salamon. Ed. PC freq. Częstochowa, 1428-1600.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	48	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	52	2,00