

Code	I.1.
Course Title (English)	Engineering Design I
Course Title (Polish)	Konstrukcja i eksploatacja maszyn oraz grafika inż. I
Credits	6 ECTS

Compulsory for Profile: Computer Modelling and Simulation (CMS), Intelligent Energy (IE), Biotechnology for Environmental Protection (BI), Business and Technology (BT)

Type of studies BSc studies

Unit running the programme Institute of Mechanics and Machine Design Fundamentals

Course coordinator and academic teachers **Bogdan Posiadała, Prof.**, Bogdan Posiadała, Assoc. prof., (Lec.), Dawid Cekus, Ph.D, (Proj.), Roman Wilczak, Ph.D., (Proj.)

Form of classes and number of hours

Semester	Lec.	Tut.	Lab.	Project	Sem.	Credit points
1	15e		-	45	-	6

Learning outcomes

The course is a foundation to techniques that allow students:

- to prepare a simple layout drawings of three dimensional technical objects in pictorial and orthographic projection,
- to read simple engineering drawings drawn in pictorial or orthographic projection,
- to read and understand dimensioning and size tolerances,

Prerequisites

Basic knowledge of computer operating

Course description

LECTURE

1. Engineering drawing as the mean of communication. Types and layouts of drawings, technical terms abbreviations and symbols. Conventional representation of common features. Freehand sketching - form and proportion, Types of lines and their application. General rules of the line work.
2. Pictorial projections. Rules of sketching in isometric and oblique. Examples of objects in isometric and oblique.
3. Orthographic projection. The rules and examples of drawing in first and third angle projection. Layout of views. Symbols of first and third angle projection.
4. Sectional views. Surfaces in section. Visualization of sections. Full sections. Lines in sectioning. Cutting planes and their sectional views. Half sections, offset sections. Marking of sectional views. Broken-out sections. Revolved and removed sections. Webs in section. Aligned sections.
5. Dimensioning - size dimensions, location dimensions. Functional, nonfunctional and auxiliary dimensions. Principles of dimensioning. Dimensioning repeated features,

leaders. Dimensioning angular position. Examples of correct and incorrect dimensioning. Tolerances. Considerations for tolerances. Definitions of basic size, deviations and limits of the size. Fits - Clearance, transition and interference fits. Selected ISO "Hole Basis" fits. Calculations of clearance and/or interference of the fit.

6. Modelling 2D drawings with CAD systems (e.g. AutoCAD)

TUTORIALS

Not applicable

LABORATORY

Not applicable

PROJECT

1. Drawing of simple objects in isometric projection.
2. Drawing in oblique projection of simple and more advanced objects
3. Views of simple components in the first angle projection.
4. Views of simple components in the third angle projection.
5. Sectional views. Full sections. Webs in section. Marking of sectional views.
6. Sectional views. Half sections, offset sections, broken-out sections, removed, revolved and aligned sections.
7. Dimensioning of simple components.
8. Dimensioning of more advanced component and calculations of tolerances and fits.
9. 2D drawings of real objects with exemplary CAD system (e.g. AutoCAD)

SEMINAR

Not applicable

Form of assessment Printed reports of projects

Basic reference materials 1. James H. Earle.: Engineering Design Graphics, Addison-Wesley Publishing Company, 1990.

Other reference materials For Polish-speaking students:

1. Zbiór polskich norm PN-/N-01601 do PN-/01635
2. Zbiór polskich norm PN-/N-01050 do PN-/01158
3. Dobrzański T.– Rysunek Techniczny Maszynowy, WNT, Warszawa 2002.
4. Pikoń A.: AutoCAD 2000. Helion, Warszawa 2000.
5. Posiadała B. (red.), Geisler T., Policiński J., Sochacki W.: Rysunek techniczny w AutoCADzie, Wydawnictwo Politechniki Częstochowskiej, Częstochowa, 2002.
6. Tarnowski W.: Podstawy projektowania technicznego. WNT, Warszawa 1997.
7. Winkler T.: Komputerowy zapis konstrukcji. WNT, Warszawa 1997.
8. Kazimierczak G., Pacula B., Budzyński A. Solid Edge. Komputerowe wspomaganie projektowania. Helion, Gliwice 2004.

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Average student workload (teaching hours + individ.)	10 hours of teaching hours + 3 hours of individual work per week
Remarks:	
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