

## SYLLABUS OF A MODULE (№ E7102)

Polish name of a module	<b>Rysunek techniczny</b>
English name of a module	<b>Technical drawing</b>
ISCED classification - Code	<i>0715</i>
ISCED classification - Field of study	<i>Mechanics and metal trades</i>
Languages of instruction	<i>English</i>
Level of qualification:	<i>BSc (EQF 6)</i>
Number of ECTS credit points	<i>6</i>
Examination:	<i>A - assignment</i>

### Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
15		45			

## **MODULE DESCRIPTION**

### **MODULE OBJECTIVES**

01. Mastering the way of reading and writing (dimensioning) the geometric shape and construction of spatial elements, parts and assemblies of mechanical devices.
02. Familiarity with the principles of drawing parts and assemblies of machines in accordance with standards for technical drawings and the use of drawing simplifications.
03. Learning to read and write schematics of complex technical systems.
04. Practical skills of drawing machine parts and assemblies in AutoCAD.

### **PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Ability to use drawing and measuring instruments.
2. Computer skills.
3. Ability to use various sources of information.
4. Ability to work independently and in a group.
5. Ability to interpretation and presentation of obtained results.

### **LEARNING OUTCOMES**

- LO 1 – Knowledge of the principle of engineering graphics.
- LO 2 – Performing technical documentation in accordance with the principles of mechanical drawing and normalization rules.
- LO 3 – Ability to use AutoCAD in 2D space.

## MODULE CONTENT

<b>Type of classes – lecture</b>	<b>Number of hours</b>
<b>Lec 1-3</b> - Monge's projection rules. Theoretical foundations of the first-angle rectangular projection method. Elements of space. Practical use of the rectangular projection method.	3
<b>Lec 4</b> - Axonometric representation (isometry, dimetrie) used in graphical design. Perspective.	1
<b>Lec 5,6</b> - Basics of technical drawing, normalization, sheets, writing, tables, types and application of lines, scales. Views and cross-sections of flat-wall bodies and rotational bodies.	2
<b>Lec 7</b> - Auxiliary projections used in graphical representation of a structure, projection to any number of viewports.	1
<b>Lec 8,9</b> - Designing outlines, sections and parts and marking them. Principles of measuring machine elements. Dimension tolerance, roughness, fit, deviation of shape and position.	2
<b>Lec 10-12</b> - Rules for the simplification and drawing of joints (threads, grooves), welded, soldered and glued joints, gears, bearings and other components.	3
<b>Lec 13</b> - Rules for creating and reading kinematic, electrical, and hydraulic diagrams.	1
<b>Lec 14</b> - Types of conical curves. Cross section of the cone - ellipse, hyperbole, parabola.	1
<b>Lec 15</b> - Cross section of the pyramid. Expanding the side surface.	1
<b>Sum</b>	<b>15</b>
<b>Type of classes– laboratory.</b>	<b>Number of hours</b>
<b>Lab 1</b> - AutoCAD interface and environment: basic drawing elements, layers creation, coordinate modes, location mode, construction lines, editing operations.	3
<b>Lab 2</b> - AutoCAD: editing commands, drawing optimization methods, prototype drawings.	3
<b>Lab 3</b> - AutoCAD: editing commands, drawing optimization methods, working drawings.	3
<b>Lab 4</b> - Execution of 6 element projections using the first-angle rectangle projection method (European method). Perform 3 views of rectangular solids.	3
<b>Lab 5</b> - Drawing flat wall element with holes. Application of the cross-section, dimensioning. Drawing a multi-plane cube.	3
<b>Lab 6</b> - Drawing of sleeve (half-view, half-section), sleeve dimensioning, surface condition, tolerancing.	3
<b>Lab 7</b> - Working drawing of the machine shaft using cross-sections in the removed section, shaft dimensioning, roughness determination, tolerance of selected dimensions, application of deviations of shape and position.	3
<b>Lab 8</b> - Making a cross section of a cone - an ellipse. Cross section of the cone - hyperbole/parabola.	3
<b>Lab 9</b> - Making a cross section of the pyramid. Expanding the side surface.	3
<b>Lab 10</b> - Execution of the working drawing of the cast/welded lever, projections, cross-sections, dimensioning, tolerances and roughness.	3
<b>Lab 11,12</b> - Making a drawing of a screw joint (2/5 bolts) / mixed joint (welded, screw, riveted and with pin), marking components, drawing of non-standard parts.	6
<b>Lab 13-15</b> - AutoCAD: Making drawings of machine parts and assemblies.	9
<b>Sum</b>	<b>45</b>

## TEACHING TOOLS

1. - Power Point presentations, lecture notes, sample problems.
2. - Laboratory tutorials.
3. - Computer workstations equipped with the AutoCAD program - educational license.
4. - Models of solids, components and assemblies of machines, technical documentation.
5. - Drawing tables, drawing instruments, manuals and measuring instruments.

## WAYS OF ASSESSMENT ( F – FORMATIVE, S – SUMMATIVE

<b>F1.</b> - assessment of preparation for laboratory exercises
<b>F2.</b> - assessment of the ability to apply the acquired knowledge while doing the exercises
<b>F3.</b> - evaluation of reports on the implementation of exercises covered by the curriculum
<b>F4.</b> - assessment of activity during classes
<b>S1.</b> - assessment of the ability to solve the problems posed and the manner of presentation obtained results - pass mark *
<b>S2.</b> - assessment of mastery of the teaching material being the subject of the lecture - exam

\*) in order to receive a credit for the module, the student is obliged to attain a passing grade in all laboratory classes as well as in achievement tests.

## STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
<b>1. Contact hours with teacher</b>		
1.1	Lectures	15
1.2	Tutorials	0
1.3	Laboratory	45
1.4	Seminar	0
1.5	Project	0
1.6	Consulting teacher during their duty hours	5
1.7	Examination	0
Total number of contact hours with teacher:		65
<b>2. Student's individual work</b>		
2.1	Preparation for tutorials and tests	0
2.2	Preparation for laboratory exercises, writing reports on laboratories	50
2.3	Preparation of project	0
2.4	Preparation for final lecture assessment	20
2.5	Preparation for examination	0
2.6	Individual study of literature	15
Total number of hours of student's individual work:		85
Overall student's workload:		150
<b>Overall number of ECTS credits for the module</b>		6 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:		2.6 ECTS
Number of ECTS credits acquired during practical classes including laboratory exercises and projects:		3.8 ECTS

## **BASIC AND SUPPLEMENTARY RESOURCE MATERIALS**

1. Branoff T: Interpreting Engineering Drawings, CENGAGE Delmar Learning, 2015.
2. Dobrzański T.: Rysunek techniczny Maszynowy, WNT, Warszawa 2002.
3. Earle J.H.: Engineering Design Graphics, Addison-Wesley Publishing Company, 1990.
4. Giesecke F.E., et all: Technical Drawing, Pearson International Edition, 2009.
5. Hamad Munir M.: AutoCAD 2010 Essentials, Jones and Bartlett Publisher, Massachusetts, 2009.
6. Leach J.: AutoCAD 2017 Instructor, SDC Publications, 2016.
7. Omura G.: Introducing AutoCAD 2009 and AutoCAD LT 2009, Wiley Publishing, 2008.
8. Simmons C.: The Essential Guide to Technical Product Specification. Engineering Drawing, British Standards Institution, 2009.
9. Zbiór polskich norm PN-EN ISO ...

## **MODULE COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)**

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