

SYLLABUS OF A MODULE

Polish name of a module	Technologia spawania
English name of a module	Welding Technology
ISCED classification - Code	0715
ISCED classification - Field of study	<i>Mechanics and metal trades</i>
Languages of instruction	<i>English</i>
Level of qualification: 1 – BSc (EQF 6) 2 – MSc (EQF 7) 3 – PhD (EQF 8)	1
Number of ECTS credit points	5
Examination: <i>EO – exam oral</i> <i>EW – exam written</i> <i>A – assignment</i>	A
Available in semester: <i>S – Spring only</i> <i>A – autumn only</i> <i>Y – both</i>	y

Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
30	15	15			

MODULE DESCRIPTION

MODULE OBJECTIVES

- O1. Provide basic knowledge about the welding technology of metals and alloys.
- O2. Provide the concept of weldability and assessment methods.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Fundamentals of materials science.
2. Knowledge of the properties of processing of alloys
3. Ability of individual work and collaboration in a group

LEARNING OUTCOMES

- LO 1 – Knowledge about the welding technologies, classification of welding methods and the type of welds as well as joints and their construction.
- LO 2 – Ability to design welding technology for selected materials and assessment of its effect on the properties of the joints.
- LO 3 – Knowledge of weldability and its evaluation.

MODULE CONTENT

Type of classes – lecture	Number of hours
Lec 1-2 - Classification of welding processes	2
Lec 3-5 - Construction of a welded joint, types of welds, joints and welding positions	3
Lec 6-7 - Characteristics of EN-ISO standards	2
Lec 8-10 - Characteristics of heat sources in welding processes	3
Lec 11-12 - The concept of weldability	2
Lec 13-15 - Cracks in welded joints	3
Lec 16-17 - Welding technology for unalloyed steels	2
Lec 18-19 - Welding technology of alloyed steels	2
Lec 20-23 - Welding technology of selected non-ferrous metals and their alloys	3
Lec 24-25 - Resistance welding technology	2
Lec 26-27 - Other methods of joining	2
Lec 28-30 – Thermal cutting, cladding and spraying	3
Sum	30
Type of classes– exercise.	Number of hours
Exe 1-2 - Calculation of welding heat input	2
Exe 3-5 - Calculation of the characteristic values of the thermal cycle of welding	3
Exe 6-8 - Analytical methods for the evaluation of weldability	3
Exe 9-11 – Assessment of propensity to crack in welded joints.	3
Exe 12-15 – Calculation of preheating temperature for welded joints.	4
Sum	15
Type of classes – laboratory	Number of hours
Lab 1-3 - Welding technology of low-carbon and low-alloy structural steels	3
Lab 4-6 - Welding technology of alloyed steels	3
Lab 7-9 - Welding technology of selected non-ferrous metals and their alloys	3
Lab 10-12 - Other methods of joining	3
Lab 13-15 - Thermal cutting, cladding and spraying	3
Sum	15

TEACHING TOOLS

1. - Lecture with Power Point presentations, lecture notes, sample problems
2. - EN-ISO standards for welding technologies
3. – Books and papers in the field of welding technologies
4. - Welding laboratory

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. - assessment of preparation for laboratory exercises
F2. - assessment of tests and quizzes checking knowledge *) carried out on the e-learning platform
F2. - assessment of the ability to apply the acquired knowledge while doing the exercises
F3. - evaluation of reports on the implementation of exercises covered by the curriculum
F4. - assessment of activity during classes

S1. - assessment of the ability to solve the problems posed and the manner of presentation obtained results - pass mark *

S2. - 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
1. Contact hours with teacher		
1.1	Lectures	30
1.2	Tutorials	15
1.3	Laboratory	15
1.4	Seminar	
1.5	Project	
1.6	Examination	
Total number of contact hours with teacher:		60
2. Student's individual work		
2.1	Preparation for tutorials and tests	20
2.2	Preparation for laboratory exercises, writing reports on laboratories	20
2.3	Preparation of project	
2.4	Preparation for final lecture assessment	10
2.5	Preparation for examination	
2.6	Individual study of literature	15
Total number of hours of student's individual work:		65
Overall student's workload:		125
Overall number of ECTS credits for the module		5
Number of ECTS points that student receives in classes requiring teacher's supervision:		2,4
Number of ECTS credits acquired during practical classes including laboratory exercises and projects:		2,0

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. Standards PN-EN-ISO on the design and technology of welded structures.
2. Jeffus L.: *Welding Principles and Applications*, Cengage Learning, 2011.
3. Andrew D. Althouse .: *Modern Welding*, Goodheart-Willcox, 2018
4. William A. Bowditch .: *Welding Fundamentals* Goodheart-Willcox, 2016

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

Dr inż. Marek Gucwa, marek.gucwa@pcz.pl

