POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	**ZAVARIVANJE 1 (WELDING 1)**			
1.2 Study program/s	MEV STUDIJ ODRŽIVOG RAZVOJA – TERMOTEHNIČKO STROJARSTVO			
1.3 Course status (O,E)	E	**1.6 Mode of instruction (number of hours)**	**Lectures**	15
1.4 Course code	According MOZVAG		**Exercises**	30
1.5 Course abbreviation	ZAV1-TTS		**Seminars**	-
1.6 Semester	5		**E-learning**	-
1.7 ECTS	4	**1.7 Place and time of instruction**	MEV – according to agenda published on official web site.	

2. TEACHING STAFF

2.1 Course leader/s-title	Vjeran Panić	**contact**	vjeran .panic@mev.hr
		contact	
2.2 Assistant/s- title	-	**contact**	-
		contact	
2.3 Instruction held by-title	-	**contact**	-

3. COURSE DESCRIPTION

3.1 Course goals	Introducing basic welding technologies and their features to students
3.2 Prerequisites	None
3.3 Course outcomes	Outcome 1: Define welding technology and welding processes. Outcome 2: List and explain the most common welding processes. Outcome 3: Explain power sources, electric beam forces, metal transition and beam regulation. Outcome 4: Explain in details REL, MAG, EPT, EO TIG PLASMA and LASER.
3.4 Course content	45 working hours divided as 15 hours of lecturing and 30 hours of exercises

3.5 Types of coursework

	Lectures	Y	Exercises	Y	Blended e-learning		Individual activities		Laboratory
	Seminars and workshops		Distant learning		Field classes	Y	Multimedia and network		Mentorship
	Other	NO							

3.6 Language of instruction	Croatian

3.7 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)

1,5	Class attendance		Seminars		Essay
	Class activity		Project		Report/paper
	Midterm exams		Practical task		Continuous knowledge check
1,5	Written exam		Experimental work		
1	Oral exam		Research		

3.8 Assessment and evaluation of students' work during classes and at the final exam

Activity specification	Percent %	Points
Written exam	72%	20
Written exam	*28%*	*8*
Total:	**100%**	**28**

3.9 Assessment criteria – analysis per learning outcomes

	Ways of evaluating learning outcomes					
	Attendance	**Activity**	**Mid-term exam 1**	**Mid-term exam 2**	**Practical work**	**Total**
Define welding technology and welding processes						7
List and explain the most common welding processes						7
Explain power sources, electric beam forces, metal transition and beam regulation						7
Explain in details REL, MAG, EPT, EO TIG PLASMA and LASER						7
Outcome not-related						
Total						28

Grading of outcomes (in order to pass the mid-term exam/exam the student must achieve at least 50% points for each learning outcome)

Points Grade

24 – 28 excellent (5)

21 – 23,99 very good (4)

17,5 – 20,99 good (3)

14 – 17,49 pass (2)

0 – 13,99 fail (1)

3.10 Specific features related with taking the course

NO

3.11 Students obligations	Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 50% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam. Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.	
3.12 Written assignments	NO	
3.13 Required reading	1.	Panić,V. Pisani materijali za kolegij Zavarivanje 1, MEV, 2019. - 2020.
3.14 Additional reading	1.	Kralj, S.; Andrić, Š. Osnove zavarivačkih i srodnih postupaka, Sveučilište u
4 ADDITIONAL COURSE INFORMATION		
4.1 Quality control	The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.	
4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.	
4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.	
4.4 Course contribution to the study program	Course expends specific technical and practical knowledge about welding such us: Idea, problems and solutions interpretation to professional and general public. Use of new technics as process of permanent education. Critical review of arguments, assumptions and data to create opinion and solve problem. Solving engineering problems of sustainable development by using math, chemistry, physics and biology. Interdisciplinary solving engineering problems of sustainable development.	
5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)		

LECTURES				
Hours	**Topic and description**	**Method** • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	**Learning outcomes**	**Course outcome**
1.	Course introduction. Definition of welding and pointing importance of this technology in modern industry.	Direct teaching	Learn modern welding trends.	Outcome No 1
2.	Introduction of welding metals. Gas welding. Electric beam welding.	Direct teaching	Learn and present welding processes and welding consumables.	Outcome No 2, 3
3.	Power sources in welding. Forces in electric beam.	Direct teaching	Learn welding power sources. Explain physics of electric beam.	Outcome No 3
4.	Metal transfer in electric beam. Regulation of electric beam length.	Direct teaching	Understand types of metal transfer in electric beam and length regulation.	Outcome No 3
5.	REL	Direct teaching	Learn to define REL features.	Outcomes No 2, 4
6.	MIG/MAG	Direct teaching	Learn to define MIG/MAG features.	Outcomes No 2, 4
7.	TIG	Direct teaching	Learn to define TIG features.	Outcomes No 2, 4
8.	EO	Direct teaching	Learn to define EO features.	Outcomes No 2, 4
9.	EPT	Direct teaching	Learn to define EPT features.	Outcomes No 2, 4
10.	PLAZMA / LASER	Direct teaching	Learn to define PLASMA/LASER features.	Outcome No 4
11.	PLAZMA / LASER	Direct teaching	Learn to define PLASMA/LASER features.	Outcome No 4
12.	PLAZMA / LASER	Direct teaching	Learn to define PLASMA/LASER features.	Outcome No 4
13.	Other welding processes.	Direct teaching	Learn to define other welding processes features.	Outcome No 4
14.	Other welding processes.	Direct teaching	Learn to define other welding processes features.	Outcome No 4

15.	Other welding processes.	Direct teaching	Learn to define other welding processes features.	Outcome No 4
EXERCISES/ SEMINARS				
Hours	**Topic and description**	**Method** • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	**Learning outcomes**	**Course outcome**
1.	Course introduction. Definition of welding and pointing importance of this technology in modern industry.	Direct teaching	Learn modern welding trends.	Outcome No 1
2.	Course introduction. Definition of welding and pointing importance of this technology in modern industry.	Direct teaching	Learn modern welding trends.	Outcome No 1
3.	Introduction of welding metals. Gass welding. Electric beam welding.	Direct teaching	Learn and present welding processes and welding consumables.	Outcome No 2, 3
4.	Introduction of welding metals. Gass welding. Electric beam welding.	Direct teaching	Learn and present welding processes and welding consumables.	Outcome No 2, 3
5.	Power sources in welding. Forces in electric beam.	Direct teaching	Learn welding power sources. Explain physics of electric beam.	Outcome No 3
6.	Power sources in welding. Forces in electric beam.	Direct teaching	Learn welding power sources. Explain physics of electric beam.	Outcome No 3
7.	Metal transfer in electric beam. Regulation of electric beam length.	Direct teaching	Understand types of metal transfer in electric beam and length regulation.	Outcome No 3
8.	Metal transfer in electric beam. Regulation of electric beam length.	Direct teaching	Understand types of metal transfer in electric beam and length regulation.	Outcome No 3
9.	REL	Direct teaching	Learn to define REL features.	Outcomes No 2, 4
10.	REL	Direct teaching	Learn to define REL features.	Outcomes No 2, 4
11.	MIG/MAG	Direct teaching	Learn to define MIG/MAG features.	Outcomes No 2, 4
12.	MIG/MAG	Direct teaching	Learn to define MIG/MAG features.	Outcomes No 2, 4

13.	TIG	Direct teaching	Learn to define TIG features.	Outcomes No 2, 4
14.	TIG	Direct teaching	Learn to define TIG features.	Outcomes No 2, 4
15.	EO	Direct teaching	Learn to define EO features.	Outcomes No 2, 4
16.	EO	Direct teaching	Learn to define EO features.	Outcomes No 2, 4
17.	EPT	Direct teaching	Learn to define EPT features.	Outcomes No 2, 4
18.	EPT	Direct teaching	Learn to define EPT features.	Outcomes No 2, 4
19.	Exercises on welding simulator.	Direct teaching	Personally weld on simulator.	Outcomes No 2, 4
20.	Exercises on welding simulator.	Direct teaching	Personally weld on simulator.	Outcomes No 2, 4
21.	Exercises on welding simulator.	Direct teaching	Personally weld on simulator.	Outcomes No 2, 4
22.	Exercises in welding practicum.	Direct teaching	Personally weld on industrial equipment.	Outcomes No 2, 4
23.	Exercises in welding practicum.	Direct teaching	Personally weld on industrial equipment.	Outcomes No 2, 4
24.	Exercises in welding practicum.	Direct teaching	Personally weld on industrial equipment.	Outcomes No 2, 4
25.	Field classes in local company	Field classes	Explain welding processes seen in local company.	Outcomes No 1, 2, 4
26.	Field classes in local company	Field classes	Explain welding processes seen in local company	Outcomes No 1, 2, 4
27.	Field classes in local company	Field classes	Explain welding processes seen in local company.	Outcomes No 1, 2, 4
28.	Repetition of complete course	Direct teaching	Answer all questions referred to complete course.	Outcomes No 1 - 4
29.	Repetition of complete course	Direct teaching	Answer all questions referred to complete course.	Outcomes No 1 - 4
30.	Repetition of complete course	Direct teaching	Answer all questions referred to complete course.	Outcomes No 1 - 4