SYLLABUS [1]

THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE

1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timişoara
1.2 Faculty[2] / Department[3]	Faculty of Mechanics / Materials Engineering and Manufacturing
1.3 Chair	—
1.4 Field of study (name/code[4])	INDUSTRIAL ENGINEERING / 20.70.10 (HG185/2018 şi HG 158/2018)
1.5 Study cycle	Master
1.6 Study program (name/code/qualification)	Efficient Welding Gas Protection Processes (P2)

2. Information about discipline

2.1 Name of discipline/The educational classe[5]	Welding Behavior of Advanced Materials						
2.2 Coordinator (holder) of course activities	Feier Anamaria						
2.3 Coordinator (holder) of applied activities[6]	Dumbravă Doru						
2.4 Year of study[7]		**2.5** Semester		**2.6** Type of evaluation		**2.7** Type of discipline[8]	DCAV

3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities[9])

3.1 Number of hours fully assisted/week	4 ,of which:	**3.2** course	2	**3.3** seminar/laboratory/project			2
3.1* Total number of hours fully assisted/sem.	56 ,of which:	**3.2*** course	28	**3.3*** seminar/laboratory/project			28
3.4 Number of hours partially assisted/week	3 ,of which:	**3.5** project, research	3	**3.6** training		**3.7** hours designing M.A. dizertation	
3.4* Number of hours pasrtially assisted/ semester	56 ,of which:	**3.5*** project of research	28	**3.6*** training		**3.7*** hours designing M.A. dizertation	
3.8 Number of hours of unassisted activities/ week	4.5 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					1.5
		Study using a manual, course materials, bibliography and lecture notes					1
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					2
3.8* Total number of hours of unasssited asctivities/ semester	68 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					24
		Study using a manual, course materials, bibliography and lecture notes					24
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					20
3.9 Total hrs./week[10]	11.5						
3.9* Total hrs./semester	124						
3.10 No. of credits	9						

4. Prerequisites (where applicable)

4.1 Curriculum	• Preferably, a graduate of a bachelor's degree program in the field of Industrial Engineering, Mechanical Engineering or Engineering and Management
4.2 Competencies	Engineering skills developed through specific mechanical engineering disciplines

[1] The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex 3), updated based on the Specific Standards ARACIS of December 2016.
[2] The name of the faculty which manages the educational curriculum to which the discipline belongs
[3] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[4] Fill in the code provided in HG no. 376/18.05.2016 or in HG similars annually updated.
[5] The educational classes of disciplines (ARACIS – specific standards, art./paragraph 4.1.2.a) are: fundamental disciplines, field disciplines, majoring/specialization disciplines.
[6] The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[7] The year of study to which the discipline is provided in the curriculum .
[8] The types of disciplines (ARACIS – specific standards, art./paragraph 4.1.2.a) are: extended knowledge discipline / advanced knowledge discipline and synthetic discipline (DA / DCAV and DS) or art./paragraph 4.1.2 b) complementary discipline (DC)).
[9] Within UPT, the number of hours from 3.1*, 3.2*,…,3.9* are obtained by multipling by 14 (weeks) the number of hours from 3.1, 3.2,…, 3.9.
[10] The total number of hours/week is obtained by summing up the number of hours from 3.1, 3.4 şi 3.8.

	regarding: • Acquisition of calculation skills, the ability to understand, synthesize and interpret the welding behavior of advanced materials. • Development of the ability to understand the fundamental elements of a reasoning, to make a classification between different processes of joining advanced materials. • Training the ability to use the specialized bibliography efficiently

5. Conditions (where applicable)

5.1 of the course	• Room 120, SPM
5.2 to conduct practical activities	• Laboratory -of design analysis and manufacturing optimization of welded structures / Room 120, SPM

6. Specific competencies acquired through this discipline

Specific competencies	• C1.3 The use of the conceptual and methodological apparatus from the fundamental disciplines of engineering for solving new, incompletely defined problems, specific to industrial engineering. C1.5 Elaboration of professional and / or research projects specific to industrial engineering, innovatively using a wide range of quantitative and qualitative methods from the fundamental disciplines of engineering. • C2.4 The nuanced and pertinent use of evaluation criteria and methods, to formulate value judgments and to base constructive decisions on advanced projects of welded structures and products and of some assisted design solutions - CAD / CAE / FEA. • C2.5 Development of advanced professional projects of welded structures and products using innovatively a wide range of assisted design methods and tools - CAD / CAE / FEA. • C3.3 Use of advanced principles, methods, and tools to solve new, incompletely defined problems related to the design and operation of modern welding technologies and equipment C3.5 Development of advanced professional projects of modern welding technologies, innovatively using a wide range of quantitative and qualitative methods. • C5.3 Use of the conceptual and methodological apparatus in research, development, innovation, to solve new problems, incompletely defined, specific to industrial engineering in general and welding engineering in particular • C5.4 The nuanced and relevant use of evaluation criteria and methods to formulate value judgments and to base decisions on research, development, and innovation situations in welding engineering
Professional competencies ascribed to the specific competencies	• C1. Solving complex tasks, specific to Industrial Engineering using advanced knowledge of engineering sciences • C2. Selection, combination and advanced use of welding processes in high productivity shielding gas environments specific to engineering in general and welding engineering in particular 3. Operation of modern welding technologies and equipment in shielding gas environments according to European norms. • C5. Selection, combination and use of welding procedures to solve tasks specific to industrial engineering in general and welding engineering in particular
Transversal competencies ascribed to the specific competencies	• CT2. Carrying out activities with the exercise of specific roles of teamwork on different hierarchical levels and with the assumption of leadership roles; promoting the spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and the continuous improvement of one's activity. (Communication, teamwork, and leadership). CT3. Objective self-assessment and diagnosis of the need for continuous professional training to enter on the labor market and adapt to the dynamics of the requirements of the market and for personal and professional development. Self-control of learning and efficient use of language skills and knowledge of technology information. (Manager of his own continuous training •

7. Objectives of the discipline (based on the grid of specific competemcies acquired)

7.1 The general objective of the discipline	• Providing to the students the fundamentals of behavior of advanced materials joining and certain advanced welding processes •
7.2 Specific objectives	• Acquiring the ability to understand, synthesize welding technologies of the advanced materials

8. Content

8.1 Course	Number of hours	Teaching methods
Synthesis of advanced materials	3	Lecture, presentation, demonstration on the board, Problematization and learning through
Synthesis of advanced joining processes	4	
Jointing of special steels for the naval field: TRICLAD	2	
Behavior in welding of advanced ceramic materials and HDPE:	6	

advanced joining technologies		discovery, illustration, Case Study, Deductive logic, Interactive debate, Use of TIC techniques, Use of dedicated software, Video animation
Welding behavior of special metallic materials: special steels, special aluminum alloys, titanium, coated steels (galvanized, plated), triclad, etc	6	
Friction riveting joint process in case of a heterogeneous joint	3	
Specific problems of joining advanced materials	4	

Bibliography[11]

1. A. Feier , Curs " Comportarea la sudare a materialelor avansate", varianta electronic CD, 2018
2. C,Şarlău, *Proiectarea maşinilor, utilajelor şi construcţiilor sudate*, Litografia IPTVP,Timişoara, 1983
3. N.O, Okerblom, Proiectarea constructiv-tehnologică a construcţiilor *sudate*, IDT, Bucureşti, 1965
4. D.Dumbravă, *Tensiuni şi deformaţii remanete la sudare*, Curs EWE, ISIM, Timişoara,1997
5. Blaga, S.T. Amancio-Filho, J.F. dos Santos, R. Bancila: Friction Riveting (FricRiveting) as a new joining technique in GFRP lightweight bridge construction
6. L. Blaga, S.T. Amancio-Filho, Jorge F. dos Santos, R. Bancila: Fricriveting of civil engineering composite laminates for bridge construction

8.2 Applied activities[12]	Number of hours	Teaching methods
PEHD joining	6	Lecture, presentation, demonstration on the board, Problematization and learning through discovery, illustration, Case Study, Deductive logic, Interactive debate, Use of TIC techniques, Use of dedicated software, Video animation
PA6 joining	6	
Solid state joining of AL	6	
AL-polymer joining	4	
Case studies	4	
Examinations of PEHD	2	

Bibliography[13]

1. A. Feier , Curs " Comportarea la sudare a materialelor avansate", variantă electronic CD, 2018
2. A. Feier, Timisoara 2018, Raport proiect Disapora - PN-III- P11.1-MCT-2018-0032
3. Ș. Panaitescu, Editura Sudura "Sudare prin frecare cu element activ rotitor"
4. Goncalo Pina Cipriano, Lucian A. Blaga, Jorge F. dos Santos, Pedro Vilaca, Sergio T. Amancio-Filho: Fundamentals of Force-Controlled Friction Riveting: Part I – Joint Formation and Heat Development
5. Goncalo Pina Cipriano, Lucian A. Blaga, Jorge F. dos Santos, Pedro Vilaca, Sergio T. Amancio-Filho: Fundamentals of Force-Controlled Friction Riveting: Part II – Joint Global Mechanical Performance and Energy Efficiency

[11] At least one title must belong to the department staff teaching the discipline, and at least one title must refer to a relevant work for the discipline, a national and international work that can be found in the UPT Library.

[12] The types of applied activities are those mentioned in 5. If the discipline containes more types of applied activities then they are marked, consecutively, in the table below. The type of activity will be marked distinctively under the form: „Seminar:", „Laboratory:", „Project:" and/or „Practice/Training:".

[13] At least one title must belong to the staff teaching the discipline.

9. Coroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

- • The discipline develops to the student's competencies on the basis of which they will be able to meet the existing requirements of the work market, in the field of welding engineering.
- • The content of the discipline is also in the chapter II of the international course of the International / European Welding Engineer (IWE / EWE)
- • Some of the topics of the course are taken from research topics from the Helmholtz Institute - Zentrum Geesthacht from Germany, in 2018 a researcher was a visiting professor for 1 month through a project Disapora - PN-III- P11.1-MCT -2018-0032 in the IMF department and had some lectures in the course " Welding Behavior of Advanced Materials "

10. Evaluation

Type of activity	**10.1** Evaluation criteria[14]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Presence / interest	Oral examination, evaluation by supporting a PowerPoint presentation on a theme for each student	60%
10.5 Applied activities	**S:**		
	L: interest	Periodic tests, questions during laboratories	30%
	P:		
	Pr:		
	Tc-R[15]: rightness	Correction practice report	10%
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified[16]			
• The acquisition of the knowledge in the direction of the welding behavior of advanced materials and advanced welding processes.			

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
Head of Department (signature)	**Date of approval in the Faculty Council [17]**	**Dean (signature)**

[14] The Syllabus must contain the evaluation method of the discipline, specifying the criteria, the metods and the forms of evaluation, as well as mentioning the share attached to these within the final mark. The evaluation criteria must correspond to all activities stipulated in the curriculum (course, seminar, laboratory, project), as well as to the methods of continuous assessment (homework, essays etc.)

[15] Tc-R= Homework-Reports

[16] For this point turn to "Ghid de completare a Fișei disciplinei" found at: http://univagora.ro/m/filer_public/2012/10/21/ghid_de_completare_fisa_disciplinei.pdf

[17] The approval is preceeded by discussing the study program's board's point of view with redgards to the syllabus.