

# SYLLABUS <sup>1</sup>

**THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE**

## 1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timișoara
1.2 Faculty <sup>2</sup> / Department <sup>3</sup>	Faculty of Mechanics / Materials Engineering and Manufacturing
1.3 Chair	—
1.4 Field of study (name/code <sup>4</sup> )	INDUSTRIAL ENGINEERING / 20.70.10 (HG185/2018 și 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 <sup>5</sup>	Industrial Welded Structures				
2.2 Coordinator (holder) of course activities	Feier Anamaria				
2.3 Coordinator (holder) of applied activities <sup>6</sup>	Dumbravă Doru				
2.4 Year of study <sup>7</sup>		2.5 Semester		2.6 Type of evaluation	2.7 Type of discipline <sup>8</sup>
					DA

## 3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities<sup>9</sup>)

3.1 Number of hours fully assisted/week	3 ,of which:	3.2 course	2	3.3 seminar/laboratory/project	1
3.1* Total number of hours fully assisted/sem.	58 ,of which:	3.2* course	28	3.3* seminar/laboratory/project	14
3.4 Number of hours partially assisted/week	1.5 ,of which:	3.5 project, research	2	3.6 training	3.7 hours designing M.A. dizertation
3.4* Number of hours pasrtially assisted/ semester	16 ,of which:	3.5* project of research	16	3.6* training	3.7* hours designing M.A. dizertation
3.8 Number of hours of unassisted activities/ week	2.5 ,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			1.5
3.8* Total number of hours of unasssited ascivities/ semester	37 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field			17
		Study using a manual, course materials, bibliography and lecture notes			12
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays			17
3.9 Total hrs./week <sup>10</sup>	7				
3.9* Total hrs./semester	111				
3.10 No. of credits	5				

## 4. Prerequisites (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> <li>Preferably, a graduate of a bachelor's degree program in the field of Industrial Engineering, Mechanical Engineering or Engineering and Management</li> </ul>
4.2 Competencies	Engineering skills developed through specific mechanical engineering disciplines

<sup>1</sup> 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.

<sup>2</sup> The name of the faculty which manages the educational curriculum to which the discipline belongs

<sup>3</sup> The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

<sup>4</sup> Fill in the code provided in HG no. 376/18.05.2016 or in HG similars annually updated.

<sup>5</sup> The educational classes of disciplines (ARACIS – specific standards, art./paragraph 4.1.2.a) are: fundamental disciplines, field disciplines, majoring/specialization disciplines.

<sup>6</sup> The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

<sup>7</sup> The year of study to which the discipline is provided in the curriculum .

<sup>8</sup> 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)).

<sup>9</sup> Within UPT, the number of hours from 3.1\*, 3.2\*,...,3.9\* are obtained by multiplying by 14 (weeks) the number of hours from 3.1, 3.2,..., 3.9.

<sup>10</sup> The total number of hours/week is obtained by summing up the number of hours from 3.1, 3.4 și 3.8.

	regarding: <ul style="list-style-type: none"> <li>• Acquisition of calculation skills, the ability to understand, synthesize and interpret the welding behavior of advanced materials.</li> <li>• Development of the ability to understand the fundamental elements of a reasoning, to make a classification between different processes of joining advanced materials.</li> <li>• Training the ability to use the specialized bibliography efficiently</li> </ul>
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## 5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> <li>• Room 120, SPM</li> </ul>
5.2 to conduct practical activities	<ul style="list-style-type: none"> <li>• Laboratory -of design analysis and manufacturing optimization of welded structures / Room 120, SPM</li> </ul>

## 6. Specific competencies acquired through this discipline

Specific competencies	<p>C1.4 The nuanced and pertinent use of evaluation criteria and methods, in order to formulate value judgments and to base decisions on some calculation methods, theories, theoretical results, phenomena, processes, specific to industrial engineering</p> <p>C1.5 Developing professional projects and / or research specific industrial engineering, using a broad range of innovative quantitative and qualitative methods of fundamental engineering disciplines</p> <p>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.</p> <p>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.</p> <p>C5.5 Development of professional projects and / or research specific industrial engineering welding engineering in general and in particular using a broad range of innovative methods and tools of research, development and innovation.</p> <p>C6.4 Use nuanced and relevant evaluation criteria and methods to formulate value judgments and substantiate decisions in modeling, simulation, monitoring and advanced quality control in welding processes.</p> <p>C6.5 Develop Of case studies, professional projects and / or research on modeling, simulation, monitoring and quality control in advanced welding processes using a broad range of innovative methods and working tools</p> <ul style="list-style-type: none"> <li>•</li> </ul>
Professional competencies ascribed to the specific competencies	<p>C1. Solving complex tasks, specific to Industrial Engineering using advanced knowledge of engineering sciences</p> <p>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</p> <p>3. Operation of modern welding technologies and equipment in shielding gas environments according to European norms.</p> <ul style="list-style-type: none"> <li>• C5. Selection, combination and use of welding procedures to solve tasks specific to industrial engineering in general and welding engineering in particular</li> <li>• C6. Selection, combination and use of tools and techniques for monitoring and advanced quality control in welding processes</li> </ul>
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>• 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).</li> <li>• 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)</li> <li>•</li> </ul>

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

7.1 The general objective of the discipline	<ul style="list-style-type: none"> <li>• Providing to the students the fundamentals of behavior of advanced materials joining and certain advanced welding processes</li> <li>•</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• Acquiring the ability to understand, synthesize welding technologies of the advanced materials</li> </ul>

## 8. Content

8.1 Course	Number of hours	Teaching methods
Synthesis of steel structures design issues	3	Lecture, presentation, demonstration on the board,
Typical constructive solutions of structures assembled by welding	4	
The issue of residual stresses and strains	3	

Constructive technological design method	5	Problematization and learning through discovery, illustration, Case Study, Deductive logic, Interactive debate, Use of TIC techniques, Use of dedicated software, Video animation
Establishing the technological order of pre-assembly welding of steel structures	3	
Specific problems of work protection at execution, oversized transport and installation on the ground and at height	10	

#### Bibliography<sup>11</sup>

1. A. Feier, *Curs de Structuri Sudate Industrial*, varianta CD, 2018
2. C. Șarlău, *Proiectarea mașinilor, utilajelor și construcțiilor sudate*, Litografia IPTVP, Timișoara, 1983
3. N. O. Okerblom, *Proiectarea constructiv-tehnologică a construcțiilor sudate*, IDT, București, 1965
4. D. Dumbravă, *Tensiuni și deformații remanete la sudare*, Curs EWE, ISIM, Timișoara, 1997
5. D. Dumbravă, *Proiectarea structurilor sudate încărcate dinamic*, Curs EWE, ISIM, Timișoara, 1997
- 6.\*\*\*, *Manual of steel construction*, American Institut of constructions, Chicago, 1999, Standarde (Norme Europene) cu referire la procedurile de control

8.2 Applied activities <sup>12</sup>	Number of hours	Teaching methods
Principles calculation of welded joints	2	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
Choosing types of welded joints that are efficient for dynamic stress and corrosion	3	
Deformation in time of welded structures	2	
Deformation at welding T-shaped bars	2	
Case studies on correct assembly of industrial welded structures	5	

#### Bibliography<sup>13</sup>

1. A. Feier, "*Curs de Structuri Sudate Industrial*", variantă CD, 2018
2. D. Radu, A. Feier, *Steel Antenna Towers – from Designing to Manufacturing Optimization*, CRSTS2018
3. D. Dumbravă, C. Șarlău, *Proiectarea mașinilor, utilajelor și construcțiilor sudate*, Lucrări de laborator, LitoIPT, 1992
4. D. Dumbravă, *Experimentări pe structuri sudate pentru determinarea deformațiilor remanente la sudare și validarea modelului teoretic*, Contract de cercetare științifică Nr.242 B/A10.1ISIM, Timișoara, 1995
5. Radu D., Galațanu Teofil, "*Fracture mechanics critical assessment of the steel structures joints*", *Conference proceedings* - 5th International Conference Contemporary Achievements in Civil Engineering 2017, 2017. y., pp. 261-269 DOI:10.14415/konferencijaGFS2017.026

### 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

<sup>11</sup> 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.

<sup>12</sup> The types of applied activities are those mentioned in 5. If the discipline contains 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:”.

<sup>13</sup> At least one title must belong to the staff teaching the discipline.

- The discipline develops to the student some competencies on the basis of which they will be able to meet the existing requirements of the work market, in the field of the design of welding structures.
- The content of the discipline is also in the chapter III of the international course of the International / European Welding Engineer (IWE / EWE)
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## 10. Evaluation

Type of activity	10.1 Evaluation criteria <sup>14</sup>	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Presence / interest	Written exam	60%
10.5 Applied activities	<b>S:</b>		
	<b>L:</b> interest	Periodic tests, questions during laboratories	30%
	<b>P:</b>		
	<b>Pr:</b>		
	<b>Tc-R<sup>15</sup>:</b> rightness	Correction practice report	10%
<b>10.6</b> Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified <sup>16</sup> )			
<ul style="list-style-type: none"> <li>• The acquisition of the knowledge in the direction of the welding behavior of advanced materials and advanced welding processes.</li> </ul>			

Date of completion

Course coordinator  
(signature)

Coordinator of applied activities  
(signature)

Head of Department  
(signature)

Date of approval in the Faculty  
Council <sup>17</sup>

Dean  
(signature)

<sup>14</sup> The Syllabus must contain the evaluation method of the discipline, specifying the criteria, the methods 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.)

<sup>15</sup> Tc-R= Homework-Reports

<sup>16</sup> 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](http://univagora.ro/m/filer_public/2012/10/21/ghid_de_completare_fisa_disciplinei.pdf)

<sup>17</sup> The approval is preceded by discussing the study program's board's point of view with regards to the syllabus.