1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timișoara
1.2 Faculty ² / Department ³	Faculty of Civil Engineering / Department of Steel Structures and Structural Mechanics
1.3 Chair	-
1.4 Field of study (name/code ⁴)	Civil Engineering / 10
1.5 Study cycle	Master
1.6 Study program (name/code/qualification)	Civil Engineering / 10

2. Information about the discipline

2.1 Name of discipline	j		Advanced Fire Design				
2.2 Coordinator (holder) of course activities		senior lecturer, PhD, Dan Pintea					
2.3 Coordinator (holder) of applied activities ⁵ senior lecturer, PhD, Dan Pintea							
2.4 Year of study ⁶	2	2.5 Semester	3	2.6 Type of evaluation	E	2.7 Type of discipline	DCA

3. Total estimated time (hours / semester of didactic activities)

3.1 No. of hrs. / week	3 , of which:	3.2 course	2	3.3 seminar/laboratory/ project/training	1
3.4 Total no. of hrs. in the education curricula	42, of which:	3.5 course	28	3.6 applied activities	14
3.7 Distribution of time for individual activi	ties related to the disci	pline			hrs.
Study using a manual, course materials, bit	liography and lecture n	iotes			5
Additional documentation in the library, on specialized electronic platforms and on the field					5
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays					5
Tutoring					
Examinations					3
Other activities					
Total hrs. of individual activities					18
3.8 Total hrs. / semester ⁷	60				
3.9 No. of credits	7	1			

4. Prerequisites (where applicable)

4.1 Curriculum	•
4.2 Competencies	•

5. Conditions (where applicable)

5.1 of the course	The course is presented on a PC in an interactive presentation mode
5.2 to conduct practical activities	• The lab works consist of drawings realised on individual PC's by each student, based on the assigned lab requirements given for each student as a pdf document.

6. Specific competencies acquired

¹ The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex3).

 $^{^2}$ 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 GD no. 493/17.07.2013.

 ⁵ The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
⁶ The year of study to which the discipline is provided in the curriculum.
⁷ It is obtained by summing up the number of hrs. from 3.4 and 3.7.

Specific competencie	• Acquiring particular knowledge in the field of advanced fire design, using natural fire curves, advanced computer modeling software specific for fire analysis, design of buildings to sustain under fire using advanced models.
Professional competencies ⁸	• The course will form competences in the domain of fire design, essential for the protection of buildings and its inhabitants under exceptional conditions.
Transversal competencies	•

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

7.1 General objective of the discipline	• The course aims to teach students advanced skills in the field of Fire Design. The students
	will learn how to model the fire using parametric fire curves or two zone model curves. The
	course will present the Finite Element Method applied to Fire Design. The two parts of the
	FEM analysis, the Thermal response of the cross section and the Mechanical response of the
	structure will be discussed. Practical design examples using the SAFIR program will be
	computed
7.2 Specific objectives	•

8. Content

8.1 Course	No. of hours	Teaching methods	
Performance based Fire Modelling	2	The course is presented	
Fire Modelling	2	sharing software on	
Fire curves, Parametric Fire Curves, Natural Fire Curves	4	requirements for the lab	
Localised Fires	2	works are given individualy as pdf	
Two Zone Model	4	documents to the students. Both the	
Fire Modelling using the Finite Element Method	2	lecture notes and lab works are accesible on the web page of the	
The SAFIR program	4		
Thermal Analysis using FEM	4	course.	
Structural Analysis at Fire Limit State using FEM	4		

Bibliography⁹

1. SAFIR: A thermal/structural program for modeling structures under fire, JM Franssen, Engineering Journal-American Institute of Steel Construction Inc 42 (3), 143-158

2. User's manual for SAFIR 2011 a computer program for analysis of structures subjected to fire, JM Franssen, University of Liege, Belgium. 3. A tool to design steel elements submitted to compartment fires—OZone V2. Part 1: pre- and post-flashover compartment fire model, J-F. Cadorin, , J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 395-427

4. A tool to design steel elements submitted to compartment fires—OZone V2. Part 2: Methodology and application, J-F. Cadorin, , D. Pintea, J-C. Dotreppe, J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 429–451

8.2 Applied activities ¹⁰	No. of hours	Teaching methods
Parametric Fire Curve Calculation	2	The course is presented
Localised Fire curves calculation	2	on a PC using screen sharing software on
Using Ozone to compute two zone model fire curves	2	students' PC's. The
Finding the temperature evolution on the cross section using the FEM method	2	requirements for the lab works are given
Modelling the structure in fire situation	3	individualy as pdf
Displacements and stress evolution under fire of structures using the FEM	3	documents to the students. Both the

⁸ The professional competencies and the transversal competencies will be treated according to the Methodology of OMECTS 5703/18.12.2011. The competencies listed in the National Register of Qualifications in Higher Education [Registrul National al Calificărilor din Învătământul Superior RNCIS] (http://www.rncis.ro/portal/page? pageid=117,70218& dad=portal& schema=PORTAL) will be used for the field of study from 1.4 and the program of study from 1.6 of this form, involving the discipline. ⁹ At least one title must belong to the department staff teaching the discipline, and at least 3 titles must refer to national and international works

relevant for the discipline, and which can be found in the Politehnica University Library. ¹⁰ The types of applied activities are those specified in footnote 5. If the discipline contains several types of applied activities, then these will be

written consecutively in the lines of the table below. The type of activity will be written in a distinct line, as "Seminar:", "Laboratory:", "Project:" and/or "Practice/Training:".

method	lecture notes and lab
	works are accesible on
	the web page of the
	course.

Bibliography¹¹

1. SAFIR: A thermal/structural program for modeling structures under fire, JM Franssen, Engineering Journal-American Institute of Steel Construction Inc 42 (3), 143-158

User's manual for SAFIR 2011 a computer program for analysis of structures subjected to fire, JM Franssen, University of Liege, Belgium.
A tool to design steel elements submitted to compartment fires—OZone V2. Part 1: pre- and post-flashover compartment fire model, J-F. Cadorin, , J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 395–427

4. A tool to design steel elements submitted to compartment fires—OZone V2. Part 2: Methodology and application, J-F. Cadorin, , D. Pintea, J-C. Dotreppe, J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 429–451

9. Corroboration 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 is in accordance with the requirements needed by civil engineers to be able perform complex analysis and design scenarios in fire situation.
- The content was updated to keep in touch with the requirements of the work market.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course		A typical structure is modeled and analyzed in fire situation using SAFIR FEM program. Interpretation of results.	50%
10.5 Applied activities	S:		
	L:		
	Р:	Homework consisting of two written projects in which a localized fire is computed and a simple structure is analyzed using a fem program in fire situation.	50%
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)			
Both grades, for evaluating the course skills and the practical works skills must be at least 5.			

Date of completion

30.01.2019

Course coordinator (signature) Coordinator of applied activities (signature)

.....

Head of Department (signature)

.....

Date of approval in the Faculty Council¹²

Dean (signature)

.....

 $^{\rm 11}$ At least one title must belong to the staff teaching the discipline.

¹² Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparține programul de studiu cu privire la fișa disciplinei.