SYLLABUS [1]

1. Information about the program

1.1 Higher education institution	Politehnica University of Timisoara
1.2 Faculty[2]/ Department [3]	Civil Engineering/Steel Structures and Structural Mechanics CMMC
1.3 Chair	—
1.4 Field of study (name/code[4])	Civil Engineering/80
1.5 Study cycle	Bachelor
1.6 Study program (name/code/qualification)	Civil Engineering in English/10 / Civil Engineer

2. Information about the discipline

2.1 Name of discipline/ formative category[5]			Metal constructions 2 / DD				
2.2 Coordinator (holder) of course activities			Prof.dr.ing. Dinu Florea				
2.3 Coordinator (holder) of applied activities[6]			As.dr.ing. Calin Neagu				
2.4 Year of study[7]	3	**2.5** Semester	6	**2.6** Type of evaluation	E	**2.7** Type of discipline[8]	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [9]

3.1 Number of fully assisted hours / week	4 of which:	**3.2** course	2	**3.3** seminar / laboratory / project	2
3.1* Total number of fully assisted hours / semester	56 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	28
3.4 Number of hours partially assisted / week	of which:	**3.5** training		**3.6** hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	**3.5*** training		**3.6*** hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	2.5 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0.5
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	35 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			7
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week [10]	6.5				
3.8* Total hours /semester	91				
3.9 Number of credits	4				

[1] The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.
[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] The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.
[5] Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).
[6] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[7] Year of studies in which the discipline is provided in the curriculum.
[8] Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).
[9] The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.
[10] The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

4. Prerequisites (where applicable)

4.1 Curriculum	• Metal constructions 1
4.2 Competencies	• To know fundamental structural analysis principles • To have the ability to use structural engineering tools such as commercial software for structural design and detailing

5. Conditions (where applicable)

5.1 of the course	• Proper lecture room: laptop, beamer, screen, whiteboard, whiteboard pens
5.2 to conduct practical activities	• Computer room, software

6. Specific competencies acquired through this discipline

Specific competencies	• Acquire knowledge about steel structures for civil applications under various loading conditions
Professional competencies ascribed to the specific competencies	• Recognizing typical structures and structural elements, specific to the graduated study programme • Design of structural elements in civil engineering, specific to graduated study programme
Transversal competencies ascribed to the specific competencies	• Documentation in Romanian and foreign language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	• To initiate the students into the main problems related the design and verification of steel structures for civil applications. A good understanding of these problems is very important for the future graduate's career as structural engineer
7.2 Specific objectives	• Concise basic knowledge concerning the design and verification of typical steel members, including beams, beam-columns, truss members, plate girders, cold formed members, behavior under various loading conditions

8. Content [11]

8.1 Course	Number of hours	Teaching methods [12]

[11] It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".
[12] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

Classification of steel members; plate elements in compression, effective width, cross sections classification	2	Power Point presentation, conversations, explanations, demonstrations using models (physical models, computer models
Elements in tension and elements in compression: configuration, strength verifications, concept of instability - stability verifications, code provisions	4	
Restrained beams in bending: type of beams, beams resistance, serviceability; Unrestrained Beams: elastic buckling, design approach	4	
Short columns, slender columns; Non-dimensional slenderness; In plane behavior, uniaxial bending, lateral torsional buckling, out of plane buckling, biaxial bending; Code design provisions	6	
Types of plate girders, applications; Behavior of plated structural elements with slender web; Design of plated structural elements in bending; Actions induced by cranes machinery, runway beams	4	
Cold-formed steel sections, fabrication; Cold-formed steel design; Connections; Types of applications	3	
Plastic analysis; General; Conditions of application; Type of analysis vs. cross section class; Cyclic behavior in bending; Factors affecting the plastic resistance	3	
Fatigue in steel elements: High cycle fatigue; Low cycle fatigue; Fatigue curves; Connection details	2	

1. Bibliography [13]
2. Note de curs, e-book, http://www.ct.upt.ro/users/DinuFlorea
3. SR EN 1993-1-1; SR EN 1993-1-3; SR EN 1993-1-5; SR EN 1993-1-7; SR EN 1993-1-8; SR EN 1993-1-9; SR EN 1993-1-10; P100-1/2013
4. C. Dalban, S. Dima, E. Chesaru, C. Serbescu: Construcţii cu structura metalica
5. SSData
6. Calculul structural global al structurilor metalice în conformitate cu SR EN 1993-1-1 şi SR EN 1998-1: recomandări, comentarii şi exemple de aplicare
7. Verificarea la stabilitate a elementelor din oţel în conformitate cu SR EN 1993-1.1. Recomandări de calcul, comentarii şi exemple de aplicare
8. Design of Cold-formed Steel Structures, ECCS and Ernst & Sohn, 2012
9. Design of steel structures for buildings in seismic areas, ECCS and Ernst & Sohn, 2017
10. Design of steel structures – 2nd edition, ECCS and Ernst & Sohn, 2016
11. Design of plated structures, ECCS and Ernst & Sohn, 2011

8.2 Applied activities [14]	Number of hours	Teaching methods
Simple structural configuration, evaluation of loads, analysis	4	Presentation,

[13] At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.
[14] Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".

Design of a truss girder: elements, connections, detailing	8	explanation, discussions, tutorial and support for application of specialized software
Design of a beam in different conditions: laterally restrained, laterally unrestrained. The verification of the beam splice connection	7	
Design of a column in different conditions: laterally restrained, laterally unrestrained, different end restraints	6	
Design and verification of a cold formed Z purlin	3	Presentation, explanation, discussions, tutorial and support for application of specialized software

Bibliography [15]

1. SR EN 1993-1-1; SR EN 1993-1-3; SR EN 1993-1-5; SR EN 1993-1-7; SR EN 1993-1-8; SR EN 1993-1-9; SR EN 1993-1-10
2. Calculul structural global al structurilor metalice în conformitate cu SR EN 1993-1-1 şi SR EN 1998-1: recomandări, comentarii şi exemple de aplicare
3. Verificarea la stabilitate a elementelor din oţel în conformitate cu SR EN 1993-1.1. Recomandări de calcul, comentarii şi exemple de aplicare
4. Access steel: (www.access-steel.com)
5. User manual SAP2000
6. User manual CoP
7. User manual LT Beam

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

- Enhanced team-work education required, especially for graduates who are going to act in the field of structural design

10. Evaluation

Type of activity	**10.1** Evaluation criteria [16]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Answering to specific subjects in the field of the course and applications	Written form	50%
10.5 Applied activities	**S:**		
	L: Application of code provisions and specific rules for design and verification of typical steel elements	Presentation of design reports for each application, answering to questions	50%
	P[17]**:**		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [18])			
• Approach of the exam questions at a satisfactory level - minim 50% • Examination of the student at applied activities delivery and defense by each student of the delivered report - minimum 50%			

[15] At least one title must belong to the discipline team.
[16] Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)
[17] In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.
[18] It will not explain how the promotion mark is awarded.

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
01.02.2018	……	……
Head of Department (signature)	**Date of approval in the Faculty Council [19]**	**Dean (signature)**
……	12.02.2018	……

[19] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.