

# SYLLABUS <sup>1</sup>

## 1. Information about the program

1.1 Higher education institution	Politehnica University of Timisoara
1.2 Faculty <sup>2</sup> / Department <sup>3</sup>	Civil Engineering/Steel Structures and Structural Mechanics CMMC
1.3 Chair	—
1.4 Field of study (name/code <sup>4</sup> )	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 <sup>5</sup>	Metal structures / DS						
2.2 Coordinator (holder) of course activities	Prof.dr.ing. Dinu Florea						
2.3 Coordinator (holder) of applied activities <sup>6</sup>	Prof.dr.ing. Dinu Florea						
2.4 Year of study <sup>7</sup>	4	2.5 Semester	7	2.6 Type of evaluation	E	2.7 Type of discipline <sup>8</sup>	DI

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

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 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			0,5
3.7* Number of hours of unassisted activities / semester	28 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			7
3.8 Total hours / week <sup>10</sup>	6				
3.8* Total hours /semester	84				
3.9 Number of credits	4				

<sup>1</sup> 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.

<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> The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.

<sup>5</sup> 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).

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

<sup>7</sup> Year of studies in which the discipline is provided in the curriculum.

<sup>8</sup> Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).

<sup>9</sup> 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.

<sup>10</sup> 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	<ul style="list-style-type: none"> <li>• Metal constructions 2</li> </ul>
4.2 Competencies	<ul style="list-style-type: none"> <li>• To know fundamental structural analysis principles</li> <li>• To have the ability to use structural engineering tools such as commercial software for structural design, structural detailing and drawing</li> <li>• To have the ability to read technical drawings</li> <li>•</li> </ul>

**5. Conditions** (where applicable)

5.1 of the course	<ul style="list-style-type: none"> <li>• Proper lecture room: laptop, beamer, screen, whiteboard, whiteboard pens</li> </ul>
5.2 to conduct practical activities	<ul style="list-style-type: none"> <li>• Computer room, software</li> </ul>

**6. Specific competencies** acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> <li>• Acquire knowledge about design, construction and erection of steel structures for civil, industrial or other type of applications.</li> </ul>
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>• Recognizing typical structures and structural elements, specific to the graduated study programme</li> <li>• Design of structural elements in civil engineering, specific to graduated study programme</li> </ul>
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>• Documentation in Romanian and foreign language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications</li> </ul>

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

7.1 The general objective of the discipline	<ul style="list-style-type: none"> <li>• To make the students become familiar with the structural design for buildings and other applications</li> <li>• To train the students into the main problems related the design, construction and erection of steel structures for civil, industrial or other type of applications.</li> <li>• A good understanding of these problems is very important for the future graduate's career as structural engineer</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• To make the students become familiar with the structural design for buildings and other applications</li> <li>• To train the students into the main problems related the design, construction and erection of steel structures for civil, industrial or other type of applications.</li> <li>• A good understanding of these problems is very important for the future graduate's career as structural engineer</li> </ul>

## 8. Content<sup>11</sup>

8.1 Course	Number of hours	Teaching methods <sup>12</sup>
Introduction Types of steel structures Ensemble of codes and other standards for design, selection of materials, conditions of execution and erection of steel structures	4	Power Point presentation, conversations, explanations, demonstrations using models (physical models, computer models)
Single story buildings Types of buildings (industrial buildings, commercial buildings, agricultural buildings) Structural configurations Analysis and design of members and joints, typical details	8	
Multi story frame buildings Evolution of multistory buildings, Low rise buildings, High rise buildings Structural systems for multistory buildings Gravity load resisting system Lateral load resisting system Facades Detailing	10	
Applications of cold-formed steel sections Steel framing; roof decking and wall cladding; detailing	3	
New structural systems for special applications: Steel plate shear walls Removable dissipative members Buckling restrained brace frames Anti-seismic devices (isolators)	3	
<ol style="list-style-type: none"> <li>1. Bibliography<sup>13</sup></li> <li>2. Note de curs, e-book, <a href="http://www.ct.upt.ro/users/DinuFlorea">http://www.ct.upt.ro/users/DinuFlorea</a></li> <li>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; SR EN 1990;</li> <li>4. C. Dalban, S. Dima, E. Chesaru, C. Serbescu: Construcții cu structura metalica</li> <li>5. SSData</li> <li>6. Calculul structural global al structurilor metalice în conformitate cu SR EN 1993-1-1 și SR EN 1998-1: recomandări, comentarii și exemple de aplicare</li> <li>7. Verificarea la stabilitate a elementelor din oțel în conformitate cu SR EN 1993-1.1. Recomandări de calcul, comentarii și exemple de aplicare</li> <li>8. D. Mateescu: Clădiri înalte cu structuri din oțel</li> <li>9. Elastic Design of Single-Span Steel Portal Frame Buildings to Eurocode 3, D M Koschmidder and D G Brown, The Steel Construction Institute, Publication Number SCI P397</li> <li>10. Design of portal frames to Eurocode 3, D G Brown, The Steel Construction Institute, Publication Number SCI P400</li> <li>11. Tall Building Design: Steel, Concrete, and Composite Systems, Bungale S. Taranath, 2016, CRC Press, ISBN 9781466556201</li> <li>12. Design of Cold-formed Steel Structures, ECCS and Ernst &amp; Sohn, 2012</li> <li>13. Design of steel structures for buildings in seismic areas, ECCS and Ernst &amp; Sohn, 2017</li> </ol>		

<sup>11</sup> 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 "(\*)".

<sup>12</sup> Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

<sup>13</sup> 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. Design of steel structures – 2nd edition, ECCS and Ernst & Sohn, 2016		
8.2 Applied activities <sup>14</sup>	Number of hours	Teaching methods
Multi story frame building Structural configuration	4	Presentation, explanation, discussions, tutorial and support for application of specialized software
Evaluation of actions, combination of actions	4	
Structural analysis	4	
Design and verification of members and connections	4	
Detailing	2	Presentation, explanation, discussions, tutorial and support for application of specialized software
Drawings, list of materials	6	Presentation, explanation, discussions, tutorial and support for application of specialized software
Technical report	4	Presentation, explanation, discussions, tutorial and support for application of specialized software
Bibliography <sup>15</sup>		
<ol style="list-style-type: none"> <li>Note de curs, e-book, <a href="http://www.ct.upt.ro/users/DinuFlorea">http://www.ct.upt.ro/users/DinuFlorea</a></li> <li>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</li> <li>Calculul structural global al structurilor metalice în conformitate cu SR EN 1993-1-1 și SR EN 1998-1: recomandări, comentarii și exemple de aplicare</li> <li>Verificarea la stabilitate a elementelor din oțel în conformitate cu SR EN 1993-1.1. Recomandări de calcul, comentarii și exemple de aplicare</li> <li>Access steel: (<a href="http://www.access-steel.com">www.access-steel.com</a>)</li> <li>Manual de utilizare SAP2000, Etabs, Safe, ACB, SteelCon, CoP, Autocad, Tekla, LT Beam</li> </ol>		

**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 content of the course and the application were corroborated with the expectations of the representatives of the epistemic community, professional associations in the field of civil and structural engineering, industry and other partners involved in the field. The unification of standards and codes – e.g. Eurocodes, and the globalization of the construction industry have been also considered in the elaboration of the content of the discipline.

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**10. Evaluation**

<sup>14</sup> 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".

<sup>15</sup> At least one title must belong to the discipline team.

Type of activity	10.1 Evaluation criteria <sup>16</sup>	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	<b>S:</b>		
	<b>L:</b> Application of code provisions and specific rules for design and verification of typical single storey and multi-storey steel structures Correctness and clarity of technical report and drawings	Presentation of design reports for each application, answering to questions	50%
	<b>P<sup>17</sup>:</b>		
	<b>Pr:</b>		
<b>10.6 Minimum performance standard</b> (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified <sup>18</sup> )			
<ul style="list-style-type: none"> <li>• Approach of the exam questions at a satisfactory level - minimum 50%</li> <li>• Delivery and defense of the technical report (evaluation of loads, analysis, design, drawings, list of materials) - minimum 50%</li> </ul>			

<b>Date of completion</b>	<b>Course coordinator (signature)</b>	<b>Coordinator of applied activities (signature)</b>
01.02.2018	.....	.....
<b>Head of Department (signature)</b>	<b>Date of approval in the Faculty Council <sup>19</sup></b>	<b>Dean (signature)</b>
.....	12.02.2018	.....

<sup>16</sup> 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.)

<sup>17</sup> 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.

<sup>18</sup> It will not explain how the promotion mark is awarded.

<sup>19</sup> The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.