

# SYLLABUS <sup>1</sup>

## 1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty <sup>2</sup> / Department <sup>3</sup>	Civil Engineering/Steel Structures and Structural Mechanics
1.3 Chair	—
1.4 Field of study (name/code <sup>4</sup> )	Civil Engineering /60
1.5 Study cycle	Master
1.6 Study program (name/code/qualification)	Advanced Design of Steel and Composite Structures/10/M

## 2. Information about discipline

2.1 Name of discipline/The educational classe <sup>5</sup>	High Rise Steel Buildings\ Field subjects						
2.2 Coordinator (holder) of course activities	Prof. Dan Dubina, PhD						
2.3 Coordinator (holder) of applied activities <sup>6</sup>	Prof. Florea Dinu, PhD						
2.4 Year of study <sup>7</sup>	2	2.5 Semester	3	2.6 Type of evaluation	E	2.7 Type of discipline <sup>8</sup>	DCA

## 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	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	,of which:	3.5 project, research		3.6 training		3.7 hours designing M.A. dizertation	
3.4* Number of hours pasrtially assisted/ semester	,of which:	3.5* project of research		3.6* training		3.7* hours designing M.A. dizertation	
3.8 Number of hours of unassisted activities/ week	5 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					1
		Study using a manual, course materials, bibliography and lecture notes					2
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					2
3.8* Total number of hours of unasssited asctivities/ semester	70 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					14
		Study using a manual, course materials, bibliography and lecture notes					28
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					28
3.9 Total hrs./week <sup>10</sup>	9						
3.9* Total hrs./semester	126						
3.10 No. of credits	8						

## 4. Prerequisites (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> <li>Bachelor Program: Mechanics of Materials, Statics, Dynamic and Seismic Engineering, Metal Structures I and 2, Composite steel-concrete structures: MSc</li> </ul>
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<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 subjects (ARACIS – specific standards, art./paragraph 4.1.2.a) are: fundamental subjects, field subjects, majoring/specialization subjects.

<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 subjects (ARACIS – specific standards, art./paragraph 4.1.2.a) are: extended knowledge subject / advanced knowledge subject and synthetic subject (DA / DCAV and DS).

<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.

	(ADS): Performance Based Seismic Design, Robustness of structures under extreme actions
<b>4.2 Competencies</b>	<ul style="list-style-type: none"> <li>Operating with engineering fundamentals and specific knowledge to design and construct steel and composite steel - concrete structures, Computer operation and Computing</li> </ul>

#### 5. Conditions (where applicable)

<b>5.1</b> of the course	<ul style="list-style-type: none"> <li>Facilities: Adequate auditorium, audio-video facilities, black board</li> </ul>
<b>5.2</b> to conduct practical activities	<ul style="list-style-type: none"> <li>Facilities: Adequate auditorium, audio-video facilities, black board</li> </ul>

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

Specific competencies	<ul style="list-style-type: none"> <li>To gain abilities for construction, design and evaluation of high rise building structures</li> </ul>
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>Competence in structural engineering for multistory buildings under specific loading conditions</li> <li>Conceptual design of multistory buildings: structural and nonstructural systems, detailing, interaction with other specialties</li> <li>Application of code provisions and advanced analyses to design/evaluate the global structural solution, members and connections</li> </ul>
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>Application of efficient and responsible work strategies (implying punctuality, seriousness and personal responsibility) based on the principles, rules and values of professional ethics</li> <li>Commitment in professional and personal development, via continuous learning and efficient adaptation to the new technical specifications</li> <li>To be updated with new/innovative materials, rules, techniques and practices in the field</li> </ul>

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

<b>7.1</b> The general objective of the discipline	<ul style="list-style-type: none"> <li>To introduce general concepts and specific / advanced topics in the design and analysis of multistory steel building structures</li> </ul>
<b>7.2</b> Specific objectives	<ul style="list-style-type: none"> <li>To give the understanding of the principles of conception, design and erection of multistory buildings</li> <li>To make students familiar with the selection and design of gravity load resisting system and lateral load resisting system</li> <li>To make students familiar with the selection and design of nonstructural components (facades, infill and partition walls)</li> <li>To make students familiar with the advanced modelling and analysis of multistory buildings under lateral loads (seismic, wind)</li> </ul>

#### 8. Content

<b>8.1</b> Course	Number of hours	Teaching methods
Short history of high-rise buildings	2	Lecturing, discussion, explanation, demonstration
Structural systems for multistory frame buildings: development, examples	2	
Multistory building systems: selection of lateral load resisting system, gravity load resisting system, sections, materials, connections, and detailing	6	
Design requirements: performance levels, design criteria, assessment	4	
Beam-to-column joints: design requirements and prequalification	2	

Technical solutions for floors	2	
Advanced technical solutions for seismic protection: dual steel solutions; buckling restrained braces; dissipative shear walls; dampers and base isolation	6	
Robustness of multistory steel buildings under loading conditions	4	
Bibliography <sup>11</sup>		
<div>1. Bungale S. Taranath, Wind and Earthquake Resistant Buildings: Structural Analysis and Design, CRC Taylor and Francis, Boca Raton, Florida, USA, 2005;</div> <div>2. Mark Sarkisian: Designing Tall Buildings. Structure and Archirecture , Routledge, Taylor&amp;Francis, New Yoyk and London, 2012</div> <div>3. SCI P391 Structural Robustness of Steel Framed Buildings, 2011.</div> <div>4. Practical Guide to Structural Robustness and Disproportionate Collapse in Buildings. The Institution of Structural Engineers, 2010</div> <div>5. EN1998: Design of structures for earthquake resistance, European Committee for Standardization, 2004;</div> <div>6. Cod de proiectare seismică P100/2013; Prevederi pentru evaluarea seismică a clădirilor existente, P100-3/2018;</div> <div>7. FEMA 350;</div> <div>8. FEMA 356;</div> <div>9. Mateescu D.: Cladiri inalte cu schelet din otel, EA, Bucuresti, 1997</div> <div>10. D. Dubina s.a, . BC nr 7/2014 Calculul structural global al structurilor metalice. Recomandari, comentarii si exemple de aplicare</div> <div>11. 11. D. Dubina s.a, . BC 2 / 2012: Calculul si proiectarea imbinărilor structurale din otel in conformitate cu SR EN 1993-1-8. Recomandari, comentarii si exemple de aplicare</div>		

<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.

**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 technical content of the course, the applications and the background information provide the structural engineer with the knowledge and expertise necessary to understand technical solutions, design, fabrication, and erection of high-rise buildings with steel and/or composite steel-concrete structures, under ordinary, seismic and special loading cases.
- The structure and content are corroborated with the expectations of the representatives of the epistemic community, professional associations in the field of civil and structural engineering, industry and other stakeholders in the field. The unification of standards and codes – e.g. Eurocodes, the globalization of the construction industry and the emerging of new challenges at the global scale have been also considered in the elaboration of the discipline content

**10. Evaluation**

Type of activity	10.1 Evaluation criteria <sup>14</sup>	10.2 Evaluation methods	10.3 Share of the final grade
<b>10.4</b> Course	Answering to specific subjects in the field of the course and applications	Q/A based on course and application	50%
<b>10.5</b> Applied activities	<b>S:</b> Case study	Case study completion and defense	50%
	<b>L:</b>		
	<b>P:</b>		
	<b>Pr:</b>		
	<b>Tc-R<sup>15</sup>:</b>		
<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>• Approach of the exam questions at a satisfactory level – minimum 50%</li> <li>• Delivery and defense of the technical report (case study) (evaluation of loads, design, simplified analysis, advanced analysis) - minimum 50%</li> </ul>			

**Date of completion**

01.04.2019

**Course coordinator  
(signature)**

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**Coordinator of applied activities  
(signature)**

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**Head of Department  
(signature)**

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

**Dean  
(signature)**

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<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 redgards to the syllabus.