

# 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
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>	Structural Glass / DS						
2.2 Coordinator (holder) of course activities	Prof.dr.ing. Ungureanu Daniel-Viorel						
2.3 Coordinator (holder) of applied activities <sup>6</sup>	Prof.dr.ing. Ungureanu Daniel-Viorel						
2.4 Year of study <sup>7</sup>	4	2.5 Semester	7	2.6 Type of evaluation	D	2.7 Type of discipline <sup>8</sup>	DO

## 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	5				

<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	•
4.2 Competencies	• To have basics

#### 5. Conditions (where applicable)

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

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

Specific competencies	<ul style="list-style-type: none"> <li>Acquire knowledge concerning the design and verification of typical glass members for civil engineering</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 initiate the students into the main problems related the design and verification of glass structures and elements for civil applications. 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>Concise basic knowledge concerning the design and verification of typical glass members, including beams, columns, plates, glass facades a.s.o. under various loading conditions.</li> </ul>

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

8.1 Course	Number of hours	Teaching methods <sup>12</sup>
Historical highlights, production and material characterization	2	Power Point
Glass strengthening methods (imposed favorable pre-stress field methods)	2	presentation, conversations,

<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.).

Laminated glass and interlayers	2	explanations
Insulated glass units	2	
Fire resistant glass, photovoltaic glass, aesthetic coating	2	
Fracture strength of glass, testing methods	2	
General design guidelines	2	
Design of compressed glass members	2	
Design of glass beams	2	
Plate and shear buckling	2	
Bolted connection of glass structures. Glued connection	4	
Curved glass, balustrades, staircases. Glass facades	4	

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

1. Educational pack of COSTActin TU0905. „Structural Glass - Novel design methods and next generation products“.
2. Haldimann, Matthias; Luible, Andreas; Overend, Mauro. "Structural Use of Glass". Structural Engineering Documents 10, IABSE, Zürich, 2008.
3. The Institution of Structural Engineers. "Structural use of glass in buildings". London: The Institution of Structural Engineers, 1999.
4. Rice, Peter; Dutton, Hugh. "Structural Glass". E & FN Spon, 1995.
5. Wiggington, Michael. "Glass in Architecture". Phaidon Press, 1996.
6. Schittich, Christian; Staib, Gerald; Balkow, Dieter; Schuler, Matthias; Sobek, Werner. "Glass Construction Manual". Basel: Birkhäuser Edition Detail, 1999.
7. Nijssen, Rob. "Glass in Structures". Birkhäuser, 2003.
8. Wurm, Jan. "Glass Structures – Design and construction of self-supporting skins" Basel-Boston-Berlin: Birkhäuser, 2007.

8.2 Applied activities <sup>14</sup>	Number of hours	Teaching methods
Design of members in tension. Design of members in compression	2	Presentation, explanation, discussion
Design of a glass column	2	
Design of a glass fin	2	
Design of insulated glass units	2	
Design of glued glass T-beam. Design of cold bent glass canopy	6	Presentation, explanation, discussion
Design of transparent acoustic barrier	2	Presentation, explanation, discussion
Design of a glass balustrade	2	Presentation, explanation, discussion
Design of a glass facades	10	Presentation, explanation, discussion

<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.

<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".

**Bibliography** <sup>15</sup>

1. prEN 16612: Glass in building – Determination of the load resistance of glass panes by calculation and testing (NA 005-09-25 AA N 870, CEN/TC129/WG8 – N312)
  2. DIN 18008: Glass in building - Design and constructions rules
    - Part 1: Terms and general bases
    - Part 2: Linearly supported glazing
    - Part 2: Linearly supported glazing, correction of DIN 18008-2
    - Part 3: Point fixed glazing
- DIN EN 13474-2. Glass in building - Design of glass panes - Part 2: Design for uniformly distributed loads; German version prEN 13474-2:2000.

**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 <sup>16</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	Written form	50%
<b>10.5</b> Applied activities	<b>S:</b>		
	<b>L:</b>		
	<b>P<sup>17</sup>:</b>		
	<b>Pr:</b> Application for designing different types of glass elements/sub-structures	Presentation of design reports for each application, answering to questions	50%
<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>18</sup> )			
<ul style="list-style-type: none"> <li>• Approach of the exam questions at a satisfactory level</li> <li>• Examination of the student at applied activities delivery and defense by each student of the delivered project</li> </ul>			

**Date of completion**

25.01.2018

**Head of Department  
(signature)**

.....

**Course coordinator  
(signature)**

**Date of approval in the Faculty  
Council <sup>19</sup>**

12.02.2018

**Coordinator of applied activities  
(signature)**

**Dean  
(signature)**

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

<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.