

SYLLABUS ¹

1. Information about the program

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

2. Information about discipline

2.1 Name of discipline/The educational classe ⁵	Advanced Design of Steel and Concrete Composite Structures						
2.2 Coordinator (holder) of course activities	Advanced Design of Steel and Concrete Composite Structures						
2.3 Coordinator (holder) of applied activities ⁶	Advanced Design of Steel and Concrete Composite Structures						
2.4 Year of study ⁷	1	2.5 Semester	2	2.6 Type of evaluation	E	2.7 Type of discipline ⁸	DA

3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities⁹)

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	3.57 ,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					1
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					1.5 7
3.8* Total number of hours of unasssited asctivities/ semester	50 ,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					14
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					22
3.9 Total hrs./week ¹⁰	7.57						
3.9* Total hrs./semester	106						
3.10 No. of credits	7						

4. Prerequisites (where applicable)

¹ 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.

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 HG no. 376/18.05.2016 or in HG similars annually updated.

⁵ The educational classes of subjects (ARACIS – specific standards, art./paragraph 4.1.2.a) are: fundamental subjects, field subjects, majoring/specialization subjects.

⁶ The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

⁷ The year of study to which the discipline is provided in the curriculum .

⁸ 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).

⁹ 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.

¹⁰ The total number of hours/week is obtained by summing up the number of hours from 3.1, 3.4 și 3.8.

4.1 Curriculum	<ul style="list-style-type: none"> Strength of Materials, Concrete structures, Steel Structures, Mechanics
4.2 Competencies	<ul style="list-style-type: none"> Recognition and design of civil engineering elements and structures
5. Conditions (where applicable)	
5.1 of the course	<ul style="list-style-type: none"> Medium-size classroom with projector and blackboard
5.2 to conduct practical activities	<ul style="list-style-type: none"> Computer room with blackboard

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> Design of composite steel and concrete elements to gravitational and seismic loads
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> Design of civil structure with the possibility of assuming the leading responsibilities Execution and maintenance activities in the domain of civil engineering Research activities, development in the domain of civil structures
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none">

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

7.1 The general objective of the discipline	<ul style="list-style-type: none"> The main objective of the course is the advanced design of civil engineering structures with composite steel and concrete elements under gravitational and seismic loads
7.2 Specific objectives	<ul style="list-style-type: none"> <i>The course is focused on the advanced design of composite steel and concrete composite elements, complementary to the course held in fourth year. Together with the applications, the course is oriented towards the practical design and optimization of composite beams (through efficient calculation of the connection between the two materials), the real advantages of the use of steel-reinforced composite columns (to axial bending and bi-directional bending), etc. The course also presents the design rules for structural composite joints, including the component method and the special requirements of composite structures located in seismic regions (typical for the whole territory of Romania). Practical applications will follow closely the issues presented in the course, and applications through manual calculations and computer program applications</i>

8. Content

8.1 Course	Number of hours	Teaching methods
1. Introduction in composite structures: typologies, current usage	3	Lectures in power-point, conversations, explanations, examples
2. Composite beams: Type of beams, Effective width of composite beams, modular ratio, Classification of composite cross-sections, Design principles, Elastic	6	

<i>resistance in bending, Plastic resistance in bending, Verification to vertical shear, Design of shear connection, Design of continuous beams, Design at serviceability limit state</i>		
<i>3. Composite columns: Design of columns under axial load; Design of columns under axial load and bending moment, Design of columns under axial load and bi-axial bending, Local buckling of steel elements, load introduction</i>	6	
<i>4. Composite connections: Types of Composite Connections, Classification, Determination of mechanical characteristics: capacity, stiffness</i>	5	
<i>5. Specific requirements for composite steel and concrete structures subjected to seismic loads: design concepts, material requirements, Structural types and behaviour factors, Design criteria and detailing rules, Rules for members</i>	5	
<i>6. Composite floors: Current Practice, Behaviour as Formwork, Composite Behaviour, Slim Floor Decking</i>	3	
Bibliography ¹¹ 1. Oehlers D.J., Bradford M.A., Composite Steel and Concrete Structural Members, ISBN 0 08 041919 Pergamon, 1995 ; 2. David A. Nethercot, Composite Construction, Spon Press, Tazlor and Francis, 2004, ISBN ISBN 0-203-45733-1		
8.2 Applied activities¹²	Number of hours	Teaching methods
<i>1. Design of beams: comparison for a steel beam, non-supported composite beam, supported composite beam</i>	4	Demonstrations, structural design, use of computer software
<i>2. Design of beams: total shear connection, partial shear connection.</i>	3	
<i>3. Design of beams: determination of cross-sectional characteristics: I+, I-, Mpl+, Mpl-</i>	3	
<i>4. Design of columns: comparison for a steel column, total encased composite column, partial encased composite column</i>	4	
<i>5. Design of columns: determination of interaction N-M diagram on strong axis, determination of interaction N-M</i>	3	

¹¹ 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.

¹² 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:“.

<i>diagram on weak axis, interaction N-M surface</i>		
6. <i>Design of connections: Steel connections subjected to positive bending, steel connections subjected to negative bending.</i>	2	
7. <i>Design of composite connections: Composite connections subjected to positive bending, composite connections subjected to negative bending</i>	2	
8. <i>Evaluation of beam cross-sectional characteristics and bending resistance in case of composite beams located in seismic zones.</i>	2	
9. <i>Design of composite floors.</i>	2	
Bibliography ¹³ 1. prEN 1994-1-1. EUROCODE 4: Part 1.1 – Design of composite steel and concrete structures Brussels: CEN, European Committee for Standardisation, Final Draft, August / September 2003 Christian Decolon, Analysis of composite structures, ISBN-10: 1-903996-02-3, Elsevier, 2002		

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

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10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁴	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Subjects offered during class	Written examination	50%
10.5 Applied activities	S:		
	L:		
	P: project	Defence of the project	50%
	Pr:		
	Tc-R¹⁵:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁶)			
• Minimum requirement is the mark 5 obtained both for examination and for the defence of the project			

Date of completion

06.02.2019

**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 ¹⁷**

**Dean
(signature)**

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¹³ At least one title must belong to the staff teaching the discipline.

¹⁴ 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.)

¹⁵ Tc-R= Homework-Reports

¹⁶ For this point turn to "Ghid de completare a Fişei disciplinei" found at: http://univagora.ro/m/filer_public/2012/10/21/ghid_de_completare_fisa_disciplinei.pdf

¹⁷ The approval is preceded by discussing the study program's board's point of view with regards to the syllabus.