

SYLLABUS ¹

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ² / Department ³	Civil Engineering / CCI
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 / Engineer

2. Information about the discipline

2.1 Name of discipline/ formative category ⁵	Building Physics						
2.2 Coordinator (holder) of course activities	Prof. Ph.D. Eng. Dan Daniel						
2.3 Coordinator (holder) of applied activities ⁶	Ph.D. Eng. Tanasa Cristina						
2.4 Year of study ⁷	2	2.5 Semester	4	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 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			0.5
		training seminars / laboratories, homework and papers, portfolios and essays			1
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			7
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week ¹⁰	6				
3.8* Total hours /semester	84				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

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.

4.1 Curriculum	•
4.2 Competencies	• Documentation in Romanian and English technical language

5. Conditions (where applicable)

5.1 of the course	• Classroom of medium capacity
5.2 to conduct practical activities	• Classroom of medium capacity

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> • Design of structural elements in civil engineering according to national codes regarding energy efficiency and acoustical design
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> • Design of structural elements in civil engineering, specific to graduated study programme • Technological and economical design for the erection, operation and maintenance works in civil engineering, specific to graduated study programme • Complying to quality and sustainable requirements for civil, industrial and agricultural constructions
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Building physics is an applied science that studies the hygrothermal, acoustical and light-related properties of building components (roofs, facades, windows, partition walls etc) rooms, buildings and visual assemblies. The basic considerations are the user requirements for thermal, acoustic and visual comfort, the user's health requisites and the more-or-less compelling demands and limitations imposed by architectural, material-related, economic and ecological considerations
7.2 Specific objectives	<ul style="list-style-type: none"> • - hygrothermal (heat, air and moisture) The specific topics are: <ul style="list-style-type: none"> -thermal insulation and thermal inertia -moisture and temperature induced movements, strains and stresses (rain, initial moisture, surface condensation, interstitial condensation); -energy demand and energy consumption; -ventilation of buildings, indoor air quality, wind comfort • - building acoustics

	<ul style="list-style-type: none"> - noise problems in and between buildings and their environment - air and impact noise transmission by wall, floors, facades and roofs - room acoustics and the abatement of installation and environmental noises • - lighting <ul style="list-style-type: none"> -day lighting -artificial lighting • -impact of both on energy consumption
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8. Content¹¹

8.1 Course	Number of hours	Teaching methods ¹²
1. Thermodynamics basic elements	4	<ul style="list-style-type: none"> • Lecturing, conversation, explication, demonstration of the Thermodynamics principles / Processes in constructional field Lecturing, conversation, explication, demonstration of the Heat flow by conduction, convection, radiation. thermal bridges/ Condense phenomenon in buildings Lecturing, conversation, explication, demonstration of the Thermal comfort / global coefficients and certification of energy performance / energetic expertise of buildings and energetic classification Lecturing, conversation, explication, of the acoustical insulation of
2. Heat flow in buildings	8	
3. Comfort in buildings. Energy efficiency design of envelope	8	
4. Acoustical performances in buildings	8	

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.).

		envelope / Insulation systems / Acoustical principles of design
<p>Bibliography ¹³ Florut C., Dan D., Tanasa C. - "Building Physics. Experimental work and analytical examples" Ed. Politehnica 2016</p> <p>Meritt Frederick, Jonathan Ricketts – Building design and construction handbook, New York, Mc Graw Hill, 2000</p> <p>Jean Pierre Jacobs – Concrete for energy efficient buildings. The benefit of thermal mass, European Concrete Platform, 2007</p> <p>Steven Szokolay - Introduction to architectural science, the basis of sustainable design, Elsevier 2008</p> <p>Hugo Hens – Building Physics, Ernst & Sohn, 2008</p> <p>Carl Eric Hagentoft – Introduction to building Physics, Student literature, 2001</p> <p>Hugo Hens - Applied Building Physics: Boundary Conditions, Building Performance and Material Properties, Ernst & Sohn, 2010</p> <p>Dan D., Secula S. – Civil engineering. Procedures for experimental tests- Draft Manuscript</p> <p>Dan D. – Building Physics – Course manuscript and powerpoint presentations</p>		
8.2 Applied activities ¹⁴	Number of hours	Teaching methods
1.Local and global behavior of building elements and indoor conditions	6	Explication and demonstration of the Indoor humidity, materials relative humidity/ Thermal resistances of elements / Reduced thermal resistances/ Thermal global coefficient evaluation/ Thermal stability of building elements and indoor conditions Explication and demonstration of the Condense verification for elements. Checking the apparition of condense on the interior surface/ Verification of water accumulation from one to another year/ Thermal insulation solutions for energy efficiency in buildings Determination of
2. Condense phenomenon in building envelope	12	
3.Laboratory determination of the thermal conductivity for different materials and thermal bridges	4	
4.Acoustic and lighting performances of buildings	6	

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".

		temperature on the surfaces and the conductivity of materials by laboratory testing The measurement of sound intensity using sound book and special equipments / Evaluation and determination of reverberation time for an existing room / Determination of light intensity by laboratory testing

Bibliography¹⁵ Meritt Frederick, Jonathan Ricketts – Building design and construction handbook, New York, Mc Graw Hill, 2000

Jean Pierre Jacobs – Concrete for energy efficient buildings. The benefit of thermal mass, European Concrete Platform, 2007

Steven Szokolay - Introduction to architectural science, the basis of sustainable design, Elsevier 2008

Hugo Hens – Building Physics, Ernst & Sohn, 2008

Carl Eric Hagentoft – Introduction to building Physics, Student literature, 2001

Hugo Hens - Applied Building Physics: Boundary Conditions, Building Performance and Material Properties, Ernst & Sohn, 2010

Dan D., Secula S. – Civil engineering. Procedures for experimental tests- Draft Manuscript

Christina Hopfe, Robert McLeod – The Passivhaus Designer's Manual, Taylor and Francis 2016

Florut C., Dan D., Tanasa C. - "Building Physics. Experimental work and analytical examples" Ed. Politehnica 2016

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 discipline is in accordance with the most important standards in Romania and cover all the requirements to understand the phenomenon of heat transfer, insulation calculation or certification of buildings. The knowledge accumulated during the program offer to the engineers the possibility to apply without additional preparation the principles and calculation procedures for buildings from design phase to reception of work on site.

10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Applications and theoretical	Written exam	66%

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.)

	subjects- 3 theoretical <i>subjects</i>		
10.5 Applied activities	S: Applications subject – application	Written exam	34%
	L:		
	P¹⁷:		
	Pr: Attendance	The attendance is monitored	
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁸)			
<ul style="list-style-type: none"> The answers to the exam subjects must accumulate a minimum score of 3.5 points out of 9 possible 			

Date of completion

January 17th, 2018

**Head of Department
(signature)**

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**Course coordinator
(signature)**

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**Date of approval in the Faculty
Council ¹⁹**

12.02.2018

**Coordinator of applied activities
(signature)**

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**Dean
(signature)**

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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.

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