

SYLLABUS

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ¹ / Department ²	Architecture and urban planning/ Architecture
1.3 Chair	—
1.4 Field of study (name/code ³)	Architecture/ 50.60.10
1.5 Study cycle	Master
1.6 Study program (name/code/qualification)	City planning and Landscaping / 50.60.10 / Master

2. Information about discipline

2.1 Name of discipline/The educational classe ⁴	Anti-seismic urban planning / DS						
2.2 Coordinator (holder) of course activities	Prof. Ph.D. eng. Marius Moșoarcă						
2.3 Coordinator (holder) of applied activities ⁵	Prof. Ph.D. eng. Marius Moșoarcă						
2.4 Year of study ⁶	2	2.5 Semester	3	2.6 Type of evaluation	E	2.7 Regime of discipline ⁷	DO

3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities⁸)

3.1 Number of hours fully assisted/week	3 ,of which:	3.2 course	2	3.3 seminar/laboratory/project	1
3.1* Total number of hours fully assisted/sem.	42 ,of which:	3.2* course	28	3.3* seminar/laboratory/project	14
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 ,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
3.8* Total number of hours of unasssited asctivities/ semester	42 ,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			14
3.9 Total hrs./week ⁹	6				
3.9* Total hrs./semester	84				
3.10 No. of credits	4				

1 The name of the faculty which manages the educational curriculum to which the discipline belongs

2 The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

3 The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated.

4 The educational classes of disciplines are: thoroughgoing study discipline (DA), advanced knowledge discipline (DCAV), synthesis discipline (DS) or complementary discipline (DC).

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

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

7 Discipline may have one of the following regimes: imposed discipline (DI) or compulsory discipline (DOb)-for the other fundamental fields of studies offered by UPT or optional discipline (DO).

8 Within UPT, the number of hours from 3.1*, 3.2*,...,3.9* are obtained by multipling by 14 (weeks) the number of hours from 3.1, 3.2, ..., 3.9.

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

4. **Prerequisites** (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> • Urban Planning project 1,2, Urban Planning Principles, Urban Theory, Urban History and techniques, Historic Zones Regeneration
4.2 Competencies	<ul style="list-style-type: none"> • Operation with basic scientific and engineering fundamentals • Knowledge of the representation of an architectural and urban project •

5. **Conditions** (where applicable)

5.1 of the course	<ul style="list-style-type: none"> • Course room with 50 students capacity • Support materials: computer, laptop, video projector, projection screen, whiteboard • During classes, telephone calls or accessing social networks are not accepted • In the case of online courses hours, it is recommended to keep the video cameras permanently open •
5.2 to conduct practical activities	<ul style="list-style-type: none"> • Seminary room • Support materials: computer, laptop, video projector, projection screen, whiteboard • During classes, telephone calls or accessing social networks are not accepted • In the case of online courses hours, it is recommended to keep the video cameras permanently open •

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

Specific competencies	<ul style="list-style-type: none"> • Ability to carry out architectural and urban planning projects • Use of knowledge of history and theory of architecture, as well as derived application methods in performing quality professional activities • Integration within a working group for the responsible fulfillment of the role reserved in the design team; solving one's own professional tasks, as well as developing the capacity to organize, collaborate and work with teammates and with higher and subordinate level
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> • C3 The capacity to sustainably plan (from an ecological, economic and social point of view), utilizing contemporary methods and techniques in the field of urban and territorial planning <ul style="list-style-type: none"> C3.1 Advanced knowledge of theoretical and methodological developments regarding sustainability in the field of urban and territorial planning, as well as the adequate utilization of a certain professional vocabulary in order to communicate with specialists from different fields C3.2 The utilization of specialised knowledge regarding sustainability in the field of urban and territorial planning in order to explain and interpret new situations, in broader contexts C3.3 The integrated utilization of the theoretical and methodological apparatus regarding sustainability in the field of urban and territorial planning, without having all the information required in order to solve new theoretical and practical problems C3.4 The nuanced and pertinent utilization of evaluation methods and criteria in order to formulate opinions and substantiate constructive decisions, based on the principles of sustainable development in the field of urban and territorial planning C3.5 The utilization of sustainable development principles in order to elaborate professional projects in the field of urban and territorial planning • C4 The capacity to substantiate a decision based on a multi-criteria applied research in the field of urban and territorial planning <ul style="list-style-type: none"> C4.1 Advanced knowledge of theoretical and methodological developments regarding multi-criteria applied research in the field of urban and territorial planning, as well as the adequate utilization of a certain professional vocabulary in order to communicate with specialists from different fields C4.2 The utilization of specialised knowledge regarding multi-criteria applied research in the field of urban and territorial planning in order to explain and interpret new situations, in broader contexts C4.3 The integrated utilization of the theoretical and methodological apparatus regarding multi-criteria applied research in the field of urban and territorial planning, without having all the information required in order to solve new theoretical and practical problems C4.4 The nuanced and pertinent utilization of evaluation methods and criteria in order to formulate opinions and substantiate constructive decisions, based on multi-criteria applied research in the field of urban and territorial planning C4.5 The utilization of multi-criteria applied research in order to elaborate professional studies and projects in the field of urban and territorial planning

Transversal competencies ascribed to the specific competencies	
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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 discipline aims to provide students with fundamental knowledge about the seismic vulnerability at a territorial scale and about the risk reduction policies.
7.2 Specific objectives	<ul style="list-style-type: none"> After completing the course, the student must be able to: (1) make a quick and appropriate seismic vulnerability assessment of an urban area; (2) assess the possible response of a city to a specific seismic scenario; (3) propose integrated risk reduction procedures; (4) be able to extract useful conclusion from case studies analysis;

8. Content

8.1 Course	Number of hours	Teaching methods
1. Seismicity and hazard	4	Presentation, discussion, questions, solving, case studies (audio-video)
2. Failure mechanisms	2	
3. Legislation	2	
4. Case study. Historic and modern earthquakes.	4	
5. Prevention and intervention policies. Kobe case study	4	
6. Seismic vulnerability assessment methodologies	2	
7. Losses scenario	2	
8. Case study. Christchurch	2	
9. Case study. Croatia	2	
10. Case study. Timisoara	2	
11. Conclusion and discussion	2	

Bibliography¹⁰

- G. Curinschi, Centrele istorice ale oraselor\$ Protejare si restaurare, sistematizare si reconstructive, valorificare urbanistica a monumentelor de arhitectura, Editura Tehnica, 1967
- F.M. Mazzolani, Protection of historical buildings, CRC Press, Taylor&Francis Group, 2009, ISBN:978-0-415-55803-7, PROHITECH 09
- M. Mosoarca, Urbanism antiseismic – note curs postat se site-ul Facultatii de Arhitectura
- COST Action C26 – Urban Habitat Constructions under Catastrophic Events – Final Report; F.M. Mazzolani – Chair, ISBN 978-0-415-60686-8, CRC Press,2010
- Alessandro Monaco, Roberto Monaco, Urbanistica e rischio sismico, Gruppo Editoriale Esselibri- Simone, 2004
- S. Chen, "Hazard Mitigation for Earthquake and Subsequent Fire," 2004
- A. S. Pereira, "The opportunity of a disaster: The economic impact of the 1755 Lisbon earthquake," Journal of Economic History, vol. 69, no. 2, pp. 466–499, 2009
- C. Nostro et al., "The Calabria - Messina earthquake of December 28, 1908: remember to reduce the risk," in Conferenza in occasione del centenario del terremoto di Reggio Calabria e Messina, 2009
- L. Binda, C. Modena, F. Casarin, F. Lorenzoni, L. Cantini, and S. Munda, "Emergency actions and investigations on cultural heritage after the L'Aquila earthquake: the case of the Spanish Fortress," Bulletin of Earthquake Engineering, vol. 9, no. 1, pp. 105–138, Feb. 2011
- A. Kaiser et al., "The Mw 6.2 Christchurch earthquake of February 2011: Preliminary report," New Zealand Journal of Geology and Geophysics, vol. 55, no. 1, pp. 67–90, 2012
- D. Gautam and H. Chaulagain, "Structural performance and associated lessons to be learned from world earthquakes in Nepal after 25 April 2015 (MW 7.8) Gorkha earthquake," Engineering Failure Analysis, vol. 68, pp. 222–243, 2016
- S. Cara, "Seismic risk assessment at Emergency Limit Condition of urban neighbourhoods: application to the Eixample District of Barcelona," Escola Tecnica Superior d'Enginyeria de Camins, 2016
- M. Dolce and G. Zuccaro, "SAVE Project: Updated Tools for the Seismic Vulnerability Evaluation of the Italian Real Estate and of Urban Systems. 1st year report," 2003

¹⁰ 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.

O. D. Cardona et al., "Determinants of risk: exposure and vulnerability," in *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, Cambridge University Press, Cambridge, pp. 65–108, 2012.

G. Calvi, R. Pinho, G. Magenes, J. Bommer, L. Restrepo, and H. Crowley, "Development of Seismic Vulnerability Assessment Methodologies over the Past 30 Years," *ISET Journal of Earthquake Technology*, vol. 43, no. 472, pp. 75–104, 2006

M. Indirli, L. A. S. Kouris, A. Formisano, R. P. Borg, and F. M. Mazzolani, "Seismic Damage Assessment of Unreinforced Masonry Structures After The Abruzzo 2009 Earthquake: The Case Study of the Historical Centers of L'Aquila and Castelvechio Subequo," *International Journal of Architectural Heritage*, vol. 7, no. 5, pp. 536–578, 2013

S. Lagomarsino, S. Cattari, and C. Calderini, "DELIVERABLE D41 European Guidelines for the seismic preservation of cultural heritage assets," 2012

U. of Padua, "WP 10.5: Integrated methodology for effective protection and earthquake improvement of cultural heritage, New integrated knowledge based approaches to the protection of cultural heritage from earthquake-induced risk," 2012

P. Moroux and B. Le Brun, "Presentation of RISK-UE project," *Bulletin of Earthquake Engineering*, vol. 4, no. 4, pp. 323–339, 2006

R. Maio, "Seismic Vulnerability Assessment of Old Building Aggregates," Universidade de Aveiro, PhD Thesis, 2013

R. Vicente, "Estratégias e metodologias para intervenções de reabilitação urbana—Avaliação da vulnerabilidade e do risco sísmico do edificado da Baixa de Coimbra, PhD Thesis, in Portuguese," University of Aveiro, 2008

A. H. Barbat, M. L. Carreño, L. G. Pujades, N. Lantada, O. D. Cardona, and M. C. Marulanda, "Seismic vulnerability and risk evaluation methods for urban areas. A review with application to a pilot area," *Structure and Infrastructure Engineering*, 2010

S. Lagomarsino, "PERPETUATE project: a performance-based approach to earthquake protection of cultural heritage, PPT presentation for Cluster meeting," Podcetrtek, Slovenia, 2011

M. Oppenheimer et al., "Emergent Risks and Key Vulnerabilities," Cambridge University Press, 2014

UNESCO, "New life for historic cities: the historic urban landscape approach explained," Paris, France, 2013

L. Pelà, "New Trends and Challenges in Large-Scale and Urban Assessment of Seismic Risk in Historical Centres," *International Journal of Architectural Heritage*, vol. 12, no. 7–8, pp. 1051–1054, Nov. 2018

A. Ansal, *Perspectives on European Earthquake Engineering and Seismology*, vol. 1. 2014

N.F. Forell, J.B. Guthrie, S. Naaseh, *Design decisions, methods and procedures*, EERI Reports

J. R. Roth, *What are the principles of insurinh natural disasters?*, EERI Reports

I. Apostol, *Seismic vulnerability assessment of historical urban centers*, Ph.D. Thesis, Ed. Politehnica, 2020

A.I. Keller, *A complex assessment methodology for historic roof structures*, Ph.D. Thesis, Ed. Politehnica, 2020

8.2 Applied activities ¹¹	Number of hours	Teaching methods
1. Introduction. Presentation of the seminary theme	1	Presentation, discussion, questions, solving, case studies, reports, essays (audio-video)
2. Case study. Prevention and intervention policies	4	
3. Individual presentations of the case studies and debates	8	
4. Conclusion and discussion	1	

Bibliography¹²

1. M. Mosoarca, I. Onescu, B. Azap, E. Onescu, N. Chieffo, M. Szitar-Sirbu, „Seismic vulnerability assessment for the historical areas of the Timisoara city, Romania”, *Engineering Failure Analysis*, Vol. 101, pp. 86-112, 2019 (WOS: 000464960500007)

2. M. Mosoarca, I. Onescu, E. Onescu, A. Anastasiadis, "Seismic vulnerability assessment methodology for historic masonry buildings in the near-field areas", *Engineering Failure Analysis*, Vol. 115, paper ID 104662, 2020 (WOS:000554871700007)

3. B. Azap, I. Apostol, M. Mosoarca, N. Chieffo, A. Formisano., *Seismic vulnerability scenarios for historical areas of Timisoara, Proceedings of 17th National Technical-Scientific Conference on Modern Technologies for the 3rd Millennium*, Oradea, Romania, pp 149-154, 2018 (WOS:000491484600026)

4. N. Chieffo, M. Mosoarca, A. Formisano, I. Apostol, "Seismic vulnerability assessment and loss estimation of an urban district of Timisoara", in *IOP Conference Series: Materials Science and Engineering*, Vol. 471, Session 9, 2019 (WOS:000465811805085)

5. I. Onescu, M. Mosoarca, B. Azap, E. Onescu, "Seismic losses scenario for cultural promenade in Timisoara Capital of Culture 2021, Romania", in *IOP Conference Series: Materials Science and Engineering*, Vol. 471, Session 9, 2019 (WOS:000465811805056)

11 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:”.

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

6. I. Onescu, E. Onescu, M. Mosoarca, "Multi-criterial vulnerability assessment for Timisoara city, Romania", in Proceedings of the 4th International Conference on Structure and Architecture, Lisabona, Portugalia, 2019
7. E. Onescu, I. Onescu, M. Mosoarca, A. Ion, "Seismic vulnerability assessment of historical group of buildings in Timisoara city", in Proceedings of 18th National Technical-Scientific Conference on Modern Technologies for the 3rd Millennium, Oradea, Romania, 2019
8. A-M. Narița, V. Gurza, R. Opreța, A. Keller, I. Apostol, , M. Mosoarca, C. Bocan, "New vulnerabilities of historic urban centers and archeological sites. Extreme Loads.", An International Journal for Engineering and Informational Sciences, Pollack Periodica, pp 15-26., 2016, ISSN 1788-1994, DOI: 10.1556/606.2016.11.3.3
9. I. Apostol, M. Mosoarca, N. Chieffo, E. Onescu, "Seismic vulnerability scenarios for Timisoara, Romania", Structural Analysis of Historical Constructions, ed. Springer, RILEM Bookseries, vol. 18, pp. 1191-1200, 2019 , ISBN: 978-3-319-99440-6
10. N. Chieffo, I. Apostol, A. Keller, M. Mosoarca, A. Marzo, "Global behavior of historical masonry structures and timber roof framework", in Proceedings of the 3rd International Conference on protection of historical constructions, Lisabona, Portugalia, 2017
11. Apostol, M. Mosoarca, E. Onescu, "Seismic vulnerability assessment for historical building as isolate/in aggregate for Timisoara city, Romania", Journal of Architecture, Urbanism and Heritage, Vol. 2, Politehnica Publishing House, 2018, ISSN: 1224-602

9. Coroboration 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

- Graduates must learn about the resilience of cities, their response in the event of an earthquake, assessing the vulnerability of a city, identifying the weaknesses and strengths of the city, developing strategies for prevention and intervention
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10. Evaluation

Type of activity	10.1 Evaluation criteria ¹³	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Answering to theoretical questions in the course area and presenting the written paper from the seminary	Oral evaluation - either face to face or on-line (using the Zoom platform, as well as the Virtual Campus)	50%
10.5 Applied activities	S: Case study written paper	Written report paper evaluation - either face to face or on-line (using the Zoom platform, as well as the Virtual Campus)	50%
	L:		
	P:		
	Pr:		
	Tc-R¹⁴:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁵)			
<ul style="list-style-type: none"> • The answers to the exam subjects must accumulate a minimum score of 5 points in the theoretical part and a minimum grade of 5 in each application, including the promotion of the seminar. • For grade 5 in the exam, the student must answer at least 3 questions, from each of the 3 topics of the seminar paper, presented in the oral exam through a Power Point presentation. • For grade 5 at the seminar, the student must present all the required pieces with at least 3 corrections, according to the seminar theme. • 			

Date of completion

08.09.2020

Course coordinator
(signature)

Coordinator of applied activities
(signature)

Head of Department

Date of approval in the Faculty
Council ¹⁶

Dean

¹³ 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.)

¹⁴ Tc-R= Homework-Reports

¹⁵ For this point turn to "Ghid de completare a Fișei disciplinei" found at: http://www.upt.ro/img/files/2018-2019/calitate/Ghid_de_completare_fisa_disciplinei.pdf

¹⁶ The approval is preceded by discussing the study program's board's point of view with regards to the syllabus.

(signature)

16.09.2020

(signature)