European Funds
Knowledge Education Development

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COURSE DESCRIPTION

1. Course title: NEW TECHNOLOGIES AND DESIGN METHODS IN ARCHITECTURE	2. Course code: RAr-A-SSII-II – NT&DMiA
3. Validity of course description: 2018/2019	
4. Level of studies: MSc programme	
5. Mode of studies: Full-time studies	
6. Field of study: Architecture	
7. Profile of studies: general academic profile	
8. Programme: -	
9. Semester: 2	
10. Faculty teaching the course: Faculty of Architecture, Department of Design and Qualitative Research in Architecture	
11. Course instructor: Michał Sitek PhD. Eng. Arch.	
12. Course classification: major	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: The student should have mastered the basic concepts and knowledge in designing energy efficient, sustainable, environmentally-friendly and high-performance buildings that guarantee a high level of comfort; In addition, he should be familiar with basic computer programs for architectural design.	
16. Course objectives: The student is expected to acquire knowledge of the use of the latest methods, techniques and tools for analyzing the performance of buildings, including advanced computer-aided architectural design tools. As a result of completing the course the student acquires the following information: definitions, terminology, general, basic area of problems related to the question of "methods of analyzing the efficiency of functioning of buildings"; Basic questions about how to use the latest, high-tech tools for analyzing the effectiveness of the project solutions in question. In addition, the student is expected to acquire skills in the use of building performance analysis techniques as well as innovative architectural design methods used in the design of passive and zero energy buildings.	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1	the student knows the definitions, terminology, general, basic areas of problems related to "the method of analyzing the efficiency of the functioning of buildings", "modern methods of designing in architecture"	Test	Lecture	K2A-W01;
2	the student is well versed in the use of state-of-the-art, high-tech tools for analyzing the efficiency of buildings	Test	Lecture	K2A-W01;
3	student has knowledge of up-to-date architectural design tools (eg. parametric design)	Test	Lecture	K2A-W01;
4	the student is able to adopt the main assumptions, goals and methods of their realization when analyzing the performance of buildings	Test and assessment of the scope, completeness and achieved project goals	Lecture, project	K2A-U04; K2A-U05; K2A-U07; K2A-U09; K2A-U10; K2A-K01
5	the student is aware of the effects of choosing specific technical and functional solutions in the design of buildings for the environment and consumption of non-renewable energy resources	Test and assessment of the scope, completeness and achieved project goals	Lecture, project	K2A-U07; K2A-U09; K2A-U10; K2A-K02; K2A-K06

18. **Teaching modes and hours**
Lecture 15 h / Project 5 h

19. Syllabus description:

Lectures:

The following subjects are presented in the course of the subject:

1. Definitions of a high-performing building.
2. Presentation of selected, most advanced technologies and methods for analyzing the performance of design solutions used in building design analyzes.
3. Technical breakthroughs in technology development used in architectural design.
4. Presentation of selected, most advanced technologies and modeling methods (eg parametric) and prefabrication in architectural design.
5. Optimization of design solutions using genetic algorithms.

Project:

During design work, a student using CAD / BIM software modifies existing design solutions for a simplified cubature model to optimize the object relationship with environment.

20. Examination: no

21. Primary sources:

1) The American Institute of Architects [2012], An Architect's Guide to Integrating Energy Modeling in the Design Process.

2) Anderson, K. [2014], Design Energy Simulation for Architects. Guide to 3D Graphics, Routledge, Taylor&Francis Group, New York.

3)

4) Reinhart C. [2014], Daylighting Handbook I. Fundamentals Designing with the Sun.

5) A. Tedeschi, [2014] AAD_Algorithms-Aided Design Parametric Strategies Using Grasshopper, Edizioni Le Penseur

6) Edited by B. Kolarevic [2005] Architecture in the Digital Age Design and Manufacturing, Taylor & Francis

7) http:// http://help.autodesk.com/view/BUILDING_PERFORMANCE_ANALYSIS/ENU/, acesse september 2018

22. Secondary sources:

1) Collected Essays by M. Goulthorpe, dECOi [2009]The Possibility of (an) Architecture, Architects, Routledge

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	**15/15**
2	Classes	**0/0**
3	Laboratory	**0/0**
4	Project	**5/5**
5	BA/ MA Seminar	
6	Other	**25/25**
	Total number of hours	**45/45**

24. Total hours: 90

25. Number of ECTS credits: 3

26. Number of ECTS credits allocated for contact hours: 2

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

26. Comments:

19.09.2018

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(date, Instructor's signature)

Approved:
D.ZIEKAN
Wydział Architektury

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(date, the Director of the Faculty Unit signature)
dr hab. inż. arch. Klaudiusz Fros