COURSE DESCRIPTION

1. Course title: INTELLIGENT BUILDING. BUILDING PERFORMANCE ANALYSES (BPA)	**2. Course code:** RAr-A-SSII-I-IBBPA
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: 1	
10. Faculty unit teaching the course: Faculty of Architecture, Department of Design and Qualitative Research in Architecture	
11. Course instructor: Dariusz Masły PhD Eng. Arch.	
12. Course classification: major	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: knowledge on basic terms and issues in the area of public use buildings' design (especially office buildings); knowledge on basic methods of building quality assessment and architectural programming (briefing)	
16. Course objectives: Students learn ways of briefing, designing and evaluating of high-performance intelligent buildings. Students learn definitions, terminology, broad, general area of issues relating to "sustainable intelligent building". Students acquire knowledge on the use of the latest methods, techniques and tools for analyzing the performance of buildings, including advanced computer-aided architectural design tools. Students gain skills in using techniques and methods of building performance analyses and designing of high-performing (zero energy) buildings.	

17. Description of learning outcomes:

No.	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	student knows definitions, terminology, general, basic area of issues relating to "high-performance, sustainable intelligent building"	presentation	lecture	K2A-W01; K2A-W02
2.	student gains broad knowledge on briefing, designing and evaluating of high-performance, sustainable intelligent buildings	presentation	lecture	K2A-W01; K2A-W02; K2A-U06
3.	student gains knowledge on application of the latest methods, techniques and tools for analyzing the performance of buildings	presentation	lecture	K2A-W01; K2A-W02
4.	student is able to propose main design solutions relating to functional, technical and behavioural quality of a high-performance, sustainable intelligent building	presentation	lecture, project	K2A-U02; K2A-U03; K2A-U05; K2A-U09
5.	student understands how proposed technical and functional solutions influence natural environment and consumption of non-renewable energy sources	presentation	lecture, project	K2A-U07; K2A-U09; K2A-K02

18. Teaching modes and hours
Lecture: 15 / Project: 30

19. Syllabus description:

Lecture:

Following issues are presented:

1. Definitions of a high-performance, sustainable intelligent building.
2. The most technologically advanced IB - examples.
3. Climate Based Daylighting Modelling.
4. Passive means of design - conduction, convection, radiation.
5. Solar geometry - sun-path diagrams.
6. Passive (architectural) design solutions: building geometry, orientation, facade systems, shading types.
7. Human comfort: thermal, visual.
8. Building performance analyses - methods, techniques, tools.

Project:

A student designs a high-performance sustainable building, creates CAD/BIM model, validates each of her/his design decisions with design simulation.

20. Examination: no

21. Primary sources:

1) Anderson K., Design Energy Simulation for Architects. Guide to 3D Graphics, New York: Routledge. Taylor&Francis Group, 2014.
2) Autodesk Design Academy - Sustainable Design. (http://academy.autodesk.com/sustainable-design).
3) DeKay M., Brown G. Z., Sun, Wind, and Light: Architectural Design Strategies. Third Edition, John Wiley & Sons, Inc.; 2014.
4) Lechner N., Heating, Cooling, Lighting : Design Methods for Architects. Second Edition, John Wiley & Sons, Inc.; 2014.
5) Masły, D.: Jakość budynków biurowych w świetle najnowszych metod oceny jakości środowiska zbudowanego; Wydawnictwo Politechniki Śląskiej; Gliwice 2009.
6) Reinhart C., Daylighting Handbook I. Fundamentals Designing with the Sun, 2014.

22. Secondary sources:

1) Hemsath T. L., Bandhosseini K. A., Energy Modeling in Architectural Design, Routledge, Taylor and Francis Group, New York, 2018.
2) Keeler M., Burke B., Fundamentals of Integrated Design for Sustainable Building, John Wiley & Sons, Inc., Hoboken, New Jersey, USA, 2018.
3) Masły, D., Daylight in high-performance intelligent sustainable offices: simulation studies, in: Education for research, research for creativity, Ed. by Jan Słyk and Lia Bezerra, Warszawa: Wydział Architektury Politechniki Warszawskiej, 2016.
4) New Buildings Institute (NBI), "Daylighting Pattern Guide", https://patternguide.advancedbuildings.net.
5) Velux, Daylight, Energy and Indoor Climate Book, https://www.velux.com/deic/.

23. Total workload required to achieve learning outcomes

No.	Teaching mode :	Contact hours / Student workload hours
1.	Lecture	15/15
2.	Classes	0/0
3.	Laboratory	0/0
4.	Project	30/30
5.	BA/ MA Seminar	0/0
6.	Other	0/0
	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

28. Comments:

27.09.2018
Dorion Matl
.....
(date, Instructor's signature)

Approved:
KIEROWNIK
Katedry Projektowania
i Badań Jakościowych w Architekturze
.....
(date, the Director of the Faculty Unit signature)
dr hab. inż. arch. Klaudiusz Fross