Wrocław University of Science and Technology
Doctoral School

COURSE CARD

1. Basic information

Course name in English:	**e-Architecture: The Game Strategies in Architectural Design**	
Course name in Polish:	**e-Architektura: Strategie gier w projektowaniu architektonicznym**	
Number of hours:	30	
Type of course:	Elective course	
Form of course:	mixed forms (combination of lecture, seminar and laboratory)	
Code of course:	W01ARU-SD0113W / AUQ100408W	
Course leader:	Dr. Eng. Arch. Ada Kwiatkowska	
Faculty of the course leader:	W1 Faculty of Architecture	
Email address of the course leader:	ada.kwiatkowska@pwr.edu.pl	
Scientific discipline(s) assigned to the course (doctoral students representing the marked disciplines can participate in the course):	Architecture and urban planning	☒
	Automation, electronic, and electrical engineering	☐
	Information and communication technology	☐
	Biomedical engineering	☐
	Chemical engineering	☐
	Civil engineering and transport	☐
	Mechanical engineering	☐
	Environmental engineering, mining, and energy	☐
	Mathematics	☐
	Chemical sciences	☐
	Physical sciences	☐
	Management and quality studies	☐

2. Objectives

C1 - Defining of the influence of new digital technologies on the future directions of development of the architectural ideas

C2 - Working out of the experimental research project, relating to the concept of architectural form in augmented reality (the electronic ecosystem)

C3- Study of the advanced game strategies and simulation techniques of transformations of architectural forms in the cyber-space

C4- Study of the criteria and procedures of the verification of research hypotheses

C5- Development of the creative, scientific and professional skills of candidate in the range of architectural research

3. Content

Detailed information about the course content, including topics and form of classes.

No.	Topic	Number of hours	Form of classes
1	A man and architectural form in the information age	1	lecture
2	e-ArchiLab: Hybrid: a man with electronic extensions	1	seminar
3	Digital architecture in the heuristic approach	1	lecture
4	e-ArchiLab: The architectural space and augmented reality	1	seminar
5	Cyber-space: strategies and research methods in the architectural laboratory of e-ArchiLab	1	lecture
6	e-ArchiLab: Experimental research study in augmented reality	1	seminar
7	Simulation games as the research methods	1	lecture
8	e-ArchiLab: Formation, in-formation, information	1	seminar
9	Scenarios of the simulation games	1	lecture
10	e-ArchiLab: Elements and principles of the simulation games (players, scenarios, play-areas, interactive space, controllers, mods)	1	seminar
11	Sensory representation of the architectural form in the digital space	1	lecture
12	e-ArchiLab: Strategies of the simulation games and architectural forms	1	seminar
13	Material simulations of the spatial structures (biomimetic, intelligent, nano-materials)	1	lecture
14	e-ArchiLab: Representations of the architectural form in digital space	1	seminar
15	Spatial simulations of the architectural forms (permutations, combinations, variations, transformations)	1	lecture
16	e-ArchiLab: Material simulations of the spatial structures	1	seminar
17	Time-simulations of the spatial structures (animations, film narrations)	1	lecture
18	e-ArchiLab: Spatial simulations of the architectural forms	1	seminar
19	Energy-simulations of the spatial structures (the optimization, effectiveness, minimization of energy-wastage)	1	lecture
20	e-ArchiLab: Time-simulations of the spatial structures	1	seminar
21	Info-simulations of the spatial structures (coding, interactive and adaptive procedures)	1	lecture
22	e-ArchiLab: Energy-simulations of the spatial structures	1	seminar
23	Fabrication of the experimental architectural form	1	lecture
24	e-ArchiLab: Info-simulations of the spatial structures	1	seminar
25	Criteria of verification of the experimental research project in augmented reality	1	lecture
26	e-ArchiLab: Prototype of the experimental architectural form	1	seminar

27	Verification of the research theses: the optimization, rationalization, complexity, readability, interactivity	1	lecture
28	e-ArchiLab: Verification of the research thesis: the optimization of prototype of the experimental form	1	seminar
29	Architectural form in the interactive space	1	lecture
30	e-ArchiLab: Test of prototype of the experimental form in augmented reality	1	seminar

4. Prerequisites

List of prerequisites relating to knowledge, skills and other competences for course participants.

1. KNOWLEDGE:

The knowledge of the problems of theory of: architectural ideas, information, aesthetics of inter-media.

2. SKILLS:

The skills of the expression of architectural ideas by using of different graphic tools and digital technologies.

3. OTHER COMPETENCES:

The theoretical theses of doctoral dissertation should relate to the subject of the research project of e-ArchiLab. Candidate is capable to communicate in fluent English.

Candidate is open-minded and creative. Candidate is characterized by an active personal manner of actualizing and updating of the knowledge in fields of architecture, art and science.

5. Learning outcomes

List of learning outcomes at level 8 of the Polish Qualifications Framework assigned to the course (mark the learning outcomes in the last column).

Symbol	Learning outcome	
	KNOWLEDGE. Doctoral student knows and understands:	
SzD_W3	the main trends in the development of the scientific or artistic disciplines covered in the curricula;	☒
SzD_W4	research methodology;	☒
SzD_W5	the rules for the dissemination of scientific results, including in open access mode;	☒
SzD_W6	the fundamental dilemmas of modern civilization;	☒
SzD_W7	the legal and ethical conditions of scientific activity;	☐
SzD_W8	the economic and other relevant conditions of scientific activity;	☐
SzD_W9	basic principles of knowledge transfer to the economic and social spheres and commercialisation of results of scientific activity and know-how related to these results.	☐

	SKILLS. Doctoral student is able to:	
SzD_U2	use knowledge from different fields of science or art to creatively identify, formulate and innovatively solve complex problems or perform research tasks, in particular: - define the purpose and subject of scientific research, formulate a research hypothesis, - develop research methods, techniques and tools, and use them creatively, - draw conclusions on the basis of scientific research; critically analyse and evaluate the results of scientific research, expertise and other creative work and their contribution to knowledge development; transfer the results of scientific activities to the economic and social spheres;	☒
SzD_U3	communicate on specialised topics to the extent that they enable an active participation in the international scientific community;	☒
SzD_U4	disseminate research results, including in popular forms;	☒
SzD_U5	initiate debates and participate in a scientific discourse;	☒
SzD_U6	be able to speak a foreign language at B2 level of the Common European Framework of Reference for Languages to a level that enables them to participate in the international scientific and professional environment;	☐
SzD_U7	plan and implement an individual or collective research or creative activity, including in an international environment;	☐
SzD_U8	independently plan and act for one's own development and inspire and organize the development of others;	☒
SzD_U9	plan classes or groups of classes and implement them using modern methods and tools.	☐
	SOCIAL COMPETENCES. Doctoral student is ready to:	
SzD_K3	fulfilling the social obligations of researchers and creators, initiate public interest activities, thinking and acting in an entrepreneurial way;	☒
SzD_K4	maintaining and developing the ethos of research and creative environments, including: - carrying out scientific activities in an independent manner, - respecting the principle of public ownership of research results, taking into account the principles of intellectual property protection.	☒

6. Evaluation

Short description of the method(s) used to evaluate the learning outcomes assigned to the course, e.g., exam, test, report, presentation, etc.

Lecture: Crediting with grade based on essay

Evaluation of the critical-interpretative analysis of theoretical problems described in essay (theorem, critical analysis, references)

Seminar: Crediting with grade based on presentation of research project's concept (prototype: application, website, questionnaire, 3D-fabrication of model, art- or arch-installation, video-film, video-game, happening)

Evaluation of the innovativeness, structural-formal attractiveness and complexity of the experimental research project's concept

7. Teaching methods

Short description of the teaching methods used during the course, e.g., multimedia presentation, discussion, literature studies, developing written documents, own work, etc.

Lecture: literature studies, developing written documents, discussion, multimedia presentation etc.

Seminar: own work, multimedia presentation, discussions, debates, case studies etc.

8. Literature

List of primary and secondary literature used to prepare the course and including additional knowledge for participants, e.g., books, textbooks, research papers, standards, web pages, etc.

PRIMARY LITERATURE:

[1] Alleva de, A. (2005) *Methods and Theories of Art History*, London: Laurence King Publishing.
[2] Brayer, Marie-Ange, Migayrou, Frédéric (ed.), *ArchiLab: Radical Experiments in Global Architecture*, Orléans: Thames & Hudson, 2001
[3] Burry, Jane, Burry, Mark, *The New Mathematics of Architecture*, New York: Thames & Hudson, 2010.
[4] Curran, Ste, *Game Plan: Great Designs that Changed the Face of Computer Gaming*, Mies: RotoVision SA, 2004.
[5] Dollens, Dennis, *Digital-Botanic Architecture: D-B-A*, Santa Fe, New York, Barcelona: Lumen Books, 2005
[6] Dunn, Nick, *Digital Fabrication in Architecture*, London: Laurence King Publishing Ltd., 2012.
[7] Ferré, Albert, Kubo, Michael, Prat, Ramon (eds.), *Verb Matters: A Survey of Current Formal and Material Possibilities in the Context of Information Age*, Architecture Boogazine, Barcelona: Actar, 2004.
[8] Gleick, James*, The Information: A History, A Theory, A Flood*, London: Fourth Estate, 2012.
[9] Kolarevic, Branko, Klinger, Kevin (eds.), *Manufacturing Material Effects: Rethinking Design and Making in Architecture*, New York, London: Routledge, 2008.
[10] Liu, Yu-Tung (ed.), *Distinguishing Digital Architecture: 6th Far Eastern International Digital Architectural Design Award*, Basel, Boston, Berlin: Birkhäuser, 2007.
[11] Sakamoto, Tomoko, Ferre, Albert, Kubo, Michael (eds.), *From Control to Design: Parametric/Algorithmic Architecture,* Barcelona: Actar, 2008.
[12] Spiller, Neil (ed.), *Cyber_Reader: Critical Writings for the Digital Era*. London: Phaidon, 2002.
[13] Spiller, Neil, *Digital Architecture Now: A Global Survey of Emerging Talent*, London: Thames & Hudson Ltd., 2008.
[14] Woodbury, Robert, *Elements of Parametric Design*, London, New York: Routledge, 2010.
[15] Woolman, Matt, *Motion Design: Graphics for Television, Music Video, Cinema and Digital Interfaces*, Singapore: RotoVision SA, 2004.

SECONDARY LITERATURE:

[1] Alison, Jane, Brayer, Marie-Ange, Migayrou, Frédéric, Spiller, Neil, *Future City: Experiment and Utopia in Architecture*, London: Thames & Hudson, 2006.
[2] Brayer, Marie-Ange, Simonot, Béatrice (eds.), *ArchiLab's Future House: Radical Experiments in Living Space,* Orléans: Thames & Hudson, 2002.
[3] Brayer, Marie-Ange, Simonot, Béatrice (eds.), *ArchiLab's Earth Buildings: Radical Experiments in Land Architecture*, Orléans: Thames & Hudson, 2003.
[4] Brockman John (ed.), *The New Humanists: Science at the Edge*, New York: Sterling, 2003.
[5] Dollens, Dennis, *The Pangolin's Guide to Biomimetics & Digital Architecture,* Santa Fe, New York, Barcelona: SITES Books, 2006.

[6] Frazer John, 1995. *An Evolutionary Architecture*, London: Architectural Association.
[7] Lieser, Wolf, *The World of Digital Art*, Berlin: Tandem Verlag GmbH, 2010.
[8] Kwiatkowska, Ada, Simulation games with the architectural forms, [in:] *Architecture, engineering and construction of built environments*, Yew-Thong Leong, George E.Lasker (eds.) Tecumseh, Ont.: The International Institute for Advanced Studies in Systems Research and Cybernetics, 2007. pp. 4-9.
[9] Kwiatkowska, Ada, Architectural metamorphoses or how to order the information emptiness? [in:] *Theory for the sake of the theory 2 : ARCHTHEO '11*, Efe Duyan (ed.). Istambul: DAKAM Publishing, 2011. pp. 247-255.
[10] Novak, Marcos, Transmitting Architecture; *Architectural Design*; no. 118, pp. 43-47, 1995.
[11] Reiser + Umemoto, *Atlas of Novel Tectonics*, New York: Princeton Architectural Press, 2006.
[12] Spiller, Neil, *Visionary Architecture: Blueprints of the Modern Imagination*. London: Thames & Hudson, 2006.
[13] Terzidis, Kostas, *Algorithmic Architecture*, Boston, London, New York: Architectural Press/Elsevier, 2006.
[14] Teyssot, Georges, Hybrid Architecture: An Environment for the Prosthetic Body; *Convergence*, vol. 11, no. 4, pp.72-84, 2005.
[15] Zellner, Peter, *Hybrid Space: New Forms in Digital Architecture*; London, Thames and Hudson 1999.

9. Other remarks

Additional remarks, comments, (e.g., language of the course)