COURSE DESCRIPTION CARD - SYLLABUS

Course name
Innovatics [S2Arch2>Inno]

Course

Field of study
Architecture

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
45

Number of credit points

3,00

Coordinators

Lecturers

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Prerequisites

- the student has an ordered, theoretically founded general knowledge covering key issues in the field of design, composition and ergonomics - the student has a basic knowledge of development trends in the field of architectural design, - the student is able to make a critical analysis of the way of functioning and evaluate the existing technical solutions, devices, systems, processes and services related to architectural design and designing architectural details - the student is able to design a simple device and object using

appropriate methods, techniques and tools - the student is aware of and understands the non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions made, - correctly identifies and resolves dilemmas related to the profession,

Course objective

1. The aim of the course is to use (strengthen) the subconscious creative processes with the use of metaphorical associations related to the appearance, structure, functioning, development and evolution of living organisms. 2. The exercises consist in finding and adapting analogies relating to nature in order to obtain innovative design solutions. 3. Acquainting students with the methodology of searching for innovative design solutions. 4. Stimulating creative thinking in architectural design. 5. Practical teaching of creative development strategies. Designing an innovative architectural solution. The didactic assumption is based on the belief that innovation is one of the most important factors determining success in the profession of an architect.

Course-related learning outcomes

Knowledge:
Knows and understands advanced analysis methods, tools, techniques and materials necessary to prepare innovative design concepts in an interdisciplinary environment, with particular emphasis on inter-branch cooperation;
Knows and understands the interdisciplinary and innovative nature of architectural and urban design and the need to integrate knowledge from other fields, as well as its application in the design process in cooperation with specialists in these fields.
Knows and understands issues related to architectural, urban and spatial planning, such as technical infrastructure, communication, natural environment, landscape architecture, economic, legal and social conditions - necessary for understanding social, economic, ecological, natural, historical, cultural, legal and other non-technical determinants of engineering activities and sees the need to take them into account in architectural, urban and rural design and spatial planning with the use of innovative solutions;
Knows and understands advanced issues of construction, construction technologies and installations, construction and building physics, covering key, complex issues in architectural, urban and planning design;
Knows and understands technical and construction regulations;

Skills:
Can evaluate the usefulness of advanced and innovative methods and tools for solving simple and complex engineering tasks, typical for architecture, urban planning and spatial planning, and select and apply appropriate methods and tools in design;
Can think creatively and act, taking into account the complex and multi-faceted conditions of design activity, as well as expressing own artistic concepts in architectural and urban design, which includes innovative solutions;;
Can integrate information obtained from various sources, formulate their interpretation and critical, detailed analysis and draw conclusions from them, as well as formulate and justify opinions and demonstrate their relationship with the design process, based on the available scientific achievements in the discipline;
Can communicate with the use of various techniques and tools in a professional and interdisciplinary environment in the scope appropriate for architectural and urban design and spatial planning that includes innovative solutions;
Can work individually and in a team, including with specialists from other industries, and take a leading role in such teams;
Can estimate the time needed to complete a complex project task that includes innovative solutions;
Can formulate new ideas and hypotheses, analyze and test novelties related to engineering and research problems in the field of architectural and urban design and spatial planning;
Can implement the principles and guidelines of universal design in architecture, urban planning and spatial planning.
Can formulate statements of a critical analysis nature in the field of architecture, as well as present and synthetically describe the ideological basis of the project based on the assumptions made;
Can use properly selected advanced computer simulations, analyzes and modern information technologies, supporting architectural and urban design, as well as evaluate the obtained results and

their usefulness in design, and draw constructive conclusions;
Can prepare and present a presentation on the detailed results of the design engineering task that includes innovative solutions, using various communication techniques, including one formulated in a commonly understandable manner;
Can prepare and present a presentation on the detailed results of the design engineering task using various communication techniques, including one formulated in a commonly understandable manner;

Social competences:
Is capable of effectively use imagination, intuition, creative attitude and independent thinking in order to solve complex design problems that includes innovative solutions;
Is capable of speak and presentat publicly;
Is capable of take the role of a coordinator of activities in the project process, manage work in a team and use interpersonal skills (resolving conflicts, negotiating skills, delegating tasks), comply with the rules of working in a team and take responsibility for joint tasks and projects;
Is capable of formulate and transfer information and opinions to the society on the latest achievements of architecture and town planning, their complex conditions and other aspects of the architect's activity;

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment criteria and project evaluation method. An important criterion for project evaluation will be the approach to the following issues:
a) searching for innovative solutions to a selected problem based on bionic analogies,
b) use of bionics as a heuristic operator,
c) improvement and rationalization of design concepts,
d) finding and separating conflicting parts or features and searching for compromises,
Summative assessment:
- the work consisting of a poster presenting the final effect of work on a selected design topic and a portfolio which is a graphic and text report from the entire project cycle is subject to evaluation
- works are assessed during the last class - exhibition of projects and voting for the 3 best works, the authors of which present the adopted design solutions in the forum of the group.
Assessment scale: 2.0; 3.0; 3.5; 4.0; 4.5; 5.0
Obtaining a positive grade for the module depends on the achievement by the student of all the learning outcomes listed in the syllabus.

Programme content

The subject of the student's work is to develop a design solution, object or architectural detail based on the bionic analogy. The student can always choose the project topic (in line with the general profile of the subject) and, with the instructor's consent, he or she can change the project group.

Course topics

Each time the student has the option to choose the subject of the project (in line with the general profile of the subject), and with the consent of the tutor, he can change the project group.
The subject of the student's work is to develop a design solution for a utility object, object or architectural detail based on a bionic analogy.
- session in teams:
- providing students with information on the principles of using bionics as a heuristic operator
- formulating problems and solving them in innovative teams,
- generating ideas, ordering and evaluating solutions
- presentation of the effects of teams' work in the group forum
- preparation of documentation from group work,
- individual part:
- individual work on design concepts for a selected issue,
- creating concept variants in relation to future trends, modern technologies and other issues related to the subject of the project,
- improvement and rationalization of design concepts,
- preparation of a description of the innovativeness of the developed project,
- making a portfolio documenting all stages of work on the project,

- making a poster presenting the solution to a selected problem.

Teaching methods

1. Design.
2. eKursy (a system supporting the teaching process and distance learning)

Bibliography

Basic:
BERGSON H.: The Creative Mind, An Introduction to Metaphysics Dover Publications (Philosophical Library). New York 2007, 133-168
BERKUN S.: The Myths of Innovation. O'Reilly, Cambridge 2010, 5-6
BONENBERG W.: „Arts-Based Research" w prognozowaniu trendów rozwojowych architektury mieszkaniowej. Środowisko Mieszkaniowe, nr 11, 2013, 47-54
CEMPEL C.: Inżynieria kreatywności w projektowaniu innowacji. Wydawnictwo Naukowe Instytutu Technologii Eksploatacji, Radom 2013
ROPER A.T., CUNNINGHAM S.W., PORTER A.: Forecasting and Management of Technology. 2nd ed., J.Wiley & Sons, Inc., London 2011
WALLAS G.: The art of thought. Hartcourt, New York 1926

Additional:
EYSENCK H.: Genius, The Natural History of Creativity. Cambridge University Press, Cambridge 1995
JANKOWSKI S., COVELLO J., BELLINI H.: IoT primer, The Internet of Things - Making sense of the next mega-trend, Equity Research. Goldman Sachs, New York 2014
LIZARRALDE G., VIEL L., BOURGAULT M., DROUIN N.: Who collaborates and innovates in architecture and urban design projects? IEEE Conference Publications. Engineering, Technology and Innovation, 2012, pp.1-11

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00