Subject description

Faculty of Architecture, WUT 2020, **Architecture** studies
Architecture for Society of Knowledge speciality

INFORMATION PROCESSES IN ARCHITECTURE		**ASK-KH-Ip**	**MSc level**	**semester 1**
Classes: **lecture** **seminar**	Hours/semester **15** **15**	Student's own workload hours: **17**	Status: **obligatory** Level: **Advanced** **Context: history / theory**	ECTS: **2** Exam: **yes**

Unit delivering this subject: Katedra Projektowania Architektonicznego
Pracownia Projektowania Architektonicznego Wspomaganego Komputerem
Subject coordinator: prof. zw. dr hab. inż. arch. Stefan Wrona

Learning outcomes and subject delivery methods

Objective of the course:

The aim of the course is to provide the knowledge and skills in information processes in architecture - the theory, overview examples of experiments and practical applications, and to familiarise students with the latest trends in the design of the architecture arising from the development of information technology. An important objective is also to organise knowledge in terms of the basic concepts of contemporary processes in the architecture and to develop the skills of formulating and recording thoughts in a way that meets scientific standards. An essential element is also creating the habit of critical analysis of information obtained and new concepts, enabling evaluation and creative use.

General description of the course:

The subject consists of a series of lectures and seminars. Lectures provide theoretical knowledge on information processes in architecture, covering such aspects as: a conscious decision-making in the complex environment of modern design work, the role of information technology in design, new architectural concepts, such as information architecture, media, new geometries, problems of visual perception (optical illusions and their use), role and definitions of parametric and generative design, theoretical foundations of prototyping and fabrication.

The seminars are dedicated to presentations and discussions on selected thematic areas within the scope of the application of information techniques in design. An essential element is a final work in the form of a podcast and scientific text, complying with standards of the conference publication.

Learning outcomes:

No. of the outcome/ area	**Description**
Knowledge	
W_01	Student has detailed theoretical knowledge related to the issues of information processes in design.
2D2_W_02	Student has knowledge about development trends and the most important new achievements in the field of computer-aided design, digital fabrication techniques, information systems.
Skills	
U_01	The student is able to obtain information from literature and other properly selected sources, integrate the information obtained, make interpretation and draw conclusions.

U_02	Student can use a scientific research to create material that is the starting point for design.
U_03	Student can present the results of work at each stage of the task using various techniques appropriate to the content (presentations, podcasts, a scientific article).
Social competences	
KS_01	Student has an awareness of the importance of precise formulation of thoughts in the context of justification of project decisions
KS_02	Student has an awareness of the need for a critical and well-grounded assessment in the field of design activities.

Learning contents:

Lectures: an overview of concepts such as information and communication architecture. Overview of the different models of architectural design: a chronological, cyclic, coaxial.
Overview of the concepts: information architecture and information society in the context of the development of civilization and technology. Categorising information architecture through presentations of examples of architectural objects realized and virtual.
Basic knowledge recall in the field of geometry. Discussion of Plato solids and their properties, derivatives and combinations, polygons of Archimedes and other regular polyhedrons, rotational solids, fractals. Comparison of Euclidean and non-Euclidean geometry.

Processing information about space, a reinterpretation of forms, and composition of the layout are key premises behind the genesis of a work of architecture. The course strives to make this process as conscious as possible. In practice, this means a need to use a philosophical (logical) basis to describe the goal and method of transformation. Technological support of the intellectual process in this phase may consist of applications for automating spatial (CAD) and graphics operations. Especially algorithmic automation and scripting allow for the design of the process itself (in contrast to designing outcomes).
Description of a parameter, parametric surface, parametric modelling and parametric design. Overview of parametric modellers, such as 3dsMax, Revit, Maya, MicroStation, Rhinoceros + ParaCloud Modeler. Review of parametric modelling technique Parametric Cell Studio. Presentation of parametric examples of objects from the fields of architecture, design and digital art.
Overview of the concept of BIM (Building Information Modeling), its applications, the most popular modellers offering BIM and architectural examples.
Demonstration of techniques of rapid prototyping and digital fabrication, their genesis, technical parameters, material capabilities, scale and accuracy of objects obtained and examples of applications. Review of devices available in the studio. Presentation of contemporary trends and architecture, such as Smart Architecture, Algorithmic Architecture, Evolutionary Architecture, illustrated with project examples.

Seminars: presentation and participation in the discussion on the chosen topic in the field presented at the lectures: broader interpretation, detailed examples, own reflection on the subject. Participation in the discussion after the presentation of the other papers. Preparation of a written work in the form of a conference paper presenting previously presented topics, properly formatted text with principles of preparing scientific texts: footnotes, bibliography, language. Preparation and publication of the podcast on the presented topic.

Teaching methods and forms:

Compulsory lecture, partly realized with the use of an e-learning platform, the cycle of 7 weeks. Lectures recorded and stored in the form of podcasts available to students of specialities. A series of lectures finalized with an exam consisting of two phases: an initial carried out by using the e-learning platform, verifying the basic orientation in the field of terminology and concepts presented on lectures and oral examination of theoretical knowledge and awareness of the student in terms of acquired social competences.
A parallel e-learning platform as a repository for course content and communication tool.
Seminar classes: presentations and discussions. Assessment work: presentation, podcast and prepared text delivered via e-learning course. (Moodle)

Method of testing the learning outcomes:

Outcome Number	Way of testing
Knowledge	
W_01	Lectures - exam
W_02	Lectures - exam Seminar - evaluation of the final work
Skills	
U_01	Seminar - evaluation of the final work and podcast final presentation.
U_02	Seminar - evaluation of the final work.
U_03	Seminar - evaluation of the final work and podcast final presentation.
Social competences	
KS_01	Seminar - evaluation of the final paper and activity in the classes Lectures - exam.
KS_02	Seminar - evaluation of the final paper and activity in the classes

Literature

Basic:

- Alexander C. ☐ Notes on the synthesis of form
- Aranda B., Lasch C. ☐ Tooling
- BOCHENSKI, J. M. (1965). The methods of contemporary thought. Dordrecht, Holland, D. Reidel Pub. Co.
- Cohen J. – The New Architect: Keeper of Knowledge and Rules
- Kolarevic B. ☐ Architecture in the digital age☐ design and manufacturing
- Liu, Lim ☐ New Tectonics
- Oosterhuis K. - Hyperbodies: toward an e-motive
- Oosterhuis K., Xia X. - iA#1 Interactive Architecture
- Terzidis K. ☐ Algorithmic Architecture
- Venturi R. ☐ Complexity and contradiction in architecture

Complimentary:

- Alexander C., Ishikawa S., Silverstein M. - A pattern language
- Bauke de Vries, Leeuwen J., Achten H. ☐ Computer-aided architectural design
- Bovill C. - Fractal geometry in architecture and design
- Callicott N. ☐ Computer☐aided manufacture in architecture
- Kieran S., Timberlake J. -☐ Refabricating architecture
- Leach N. ☐The anaesthetics of architecture
- Lynn G. ☐ Animate form
- Mitchell M. ☐ An introduction to genetic algorithms
- Mitchell W.J. ☐ City of bits: space, place, and the infobahn
- Schmitt G.☐ Information architecture basis and Future of CAAD