Subject description

Faculty of Architecture, WUT 2020, **Architecture** studies

Architecture for Society of Knowledge specialty

GEOGRAPHIC INFORMATION SYSTEMS		ASK-KW-Gs	MSc level	semester 1
Classes: **lecture** **computer lab**	Hours/semester **15** **15**	Student's own workload hours: **12**	Status: **obligatory** Level: **Advanced** Context: **workshop**	ECTS: **2** Exam: **no**

Unit delivering this subject: Katedra Projektowania Architektonicznego
Pracownia Projektowania Architektonicznego Wspomaganego Komputerem
Teacher: dr inż. arch. Małgorzata Hanzl

Learning outcomes and subject delivery methods

Objective of the course:
After completing the course students demonstrate knowledge on basic issues of geoinformation. They are able to apply GIS to the urban planning process, at different stages and implementations. They use the GMES data. They analyze urban structures, define characteristic features of given place. They define a research problem, create data models and conduct quantitative/ qualitative and spatial analyses. They use and create data following the INSPIRE recommendations. They convert data from different sources and of different quality into the readable presentation.

General description of the course:
Exercises introduce practical competence of use of the GIS technology, starting from usage of different kinds of data available in practice, through building of the data model and data analyses: qualitative/ quantitative/ spatial up to the issues of data presentation, including 3D presentation, and conversion/ creation following the INSPIRE standards. The exercises include also the practical skills of ArcGIS software. i.e.: ArcView and 3DAnalist modules.
The lecture complements the exercises, explaining issues concerning using of GIS in the urban planner work-craft, in different applications, including analyses of data describing different features: urban form and immaterial aspects available for description thanks to the use of GIS. Important part concerns the presentation of information with the localization attribute.

Learning outcomes

No. of the outcome/ area	Description
Knowledge	
W_01	Student presents specific theoretical background covering use of GIS for the analyses of physical urban form and immaterial aspects of the functioning of urban areas.
W_02	Student presents knowledge about geomatics, including use of GIS in urban planning.
Skills	
U_01	Student uses different kinds of data to build a GIS model.
U_02	Student uses methods of quantitative/ qualitative and spatial analyses.
U_03	Student creates and converts data following the GIS standards.
U_04	Student communicates results, including communicating of the analytical content.
U_05	Student defines a research problem, conducts the research and communicates its results in an effective way.

Social competences	
KS_01	Student realizes research project, organizes and works in a group to complete it.
KS_02	Student acts and thinks in a creative way.

Learning contents:

Lecture: Theory of communicative planning and communicative rationality. Classification of public participation. Analysis of a conflict situation. Case study: Building the participating environment. Planning as an information process. INSPIRE Directive. The source of information as a node of network communication. Assembling of data concerning a site as a process of education and building of public confidence. The use of IT for building a base of knowledge involving public participation. Methods and techniques of participation – elements of social communication. Case study: methods of communication. Typology of network participation. The possibilities and limitations concerning the use of digital communication in the planning process. Communication in urban planning – text and drawings, drawings of an analyses, and presentations as the supplementary technique. Different planning records, i.e.: zoning, forms-based codes, regulating plans. Workshops as a method of participation, i.e.: pattern language, Planning for Real, and charrettes. Discussion panel – workshops about the need for prioritising. The possibility of organising workshops via remote systems and with the use of Augmented Reality. Legal regulations concerning public participation in urban planning - a comparative approach. Methods of public participation in the urban planning process . An analysis of methods: process course and techniques. Examples of scenarios for different planning applications./ Analysis of methods of creation of successful public realm.

Project for the downtown area, including the redevelopment of deprived post-industrial/housing areas: . An analysis of preconditions and external relations in the scale of the region and of the city covering the following fields: transportation, demography, citizens' activity (based on GUS data) and environmental conditions. An analysis of the current development of the area – urban inventory. An analysis of the external relations of the given area. An analysis of the morphological structure, including the historical conditions of the site development and characteristics of built-up areas, and open spaces: streets and squares. An analysis of the current functioning of an area, including transportation, sociometric layout, social settings, property structure, environmental conditions, etc. A definition of the project assumptions as a result of the SWOT analysis. Models of the future functioning of the area and a redevelopment concept of the spatial structure and its outside relations. A record of the design in the form of a local urban development plan (drawing of the plan and excerpts from the City Council's resolution). A proposal for the scenario of the project implementation, including public participation in the planning process is required, which should cover the whole area or the chosen pieces, depending on the design concept.

Lecture: Introduction to GIS. Definitions and basic information on: geoinformation, reference data, thematic data, meta data. Classification of GIS data. Data collection and GMES - GMES - Global Monitoring for Environment and Security. Possibilities of remote data acquisition and analysis of imaginary. INSPIRE Directive – development of infrastructure of spatial information in Europe. Standardisation of spatial data and planning notation. Ways of modeling and following the behaviors of users of space, i.e. Space Syntax. 3D imaginary. PPGIS – Participatory Planning GIS, crowd-sourcing, „neogeography". Supporting the process modeling as an illustration for discussion, e.g. WhatIf, CommunityPlanningViz. Describing spatial structure with the use of GIS. Introduction to qualitative/ quantitative analyses. Spatial analyses, i.e. supporting of analyses of financial outcomes of master plans, methods to count urban factors, etc. Spatial data presentation issues – geoinfographics. Methodology of GIS analyses. Creating and conversion of data. 3D data and information, possibilities of presentation.

Teaching methods and forms :

Compulsory lecture, partly realized with the use of an e-learning platform, the cycle of 14 weeks
The e-learning platform, acting simultaneously as a depository of course content and the communication tool.
The lecture introduces basic knowledge necessary to conduct the research project, including definition of the problem, plan of the research, the research itself preceded by the necessary queries, modeling of data and the presentation of results in the form of web-page: blog or wiki.
Compulsory exercises, completed individually, following the schedule. Evaluation of exercises upon

completion of the following steps, with the use of an e-learning platform (Moodle)

Method of testing the learning outcomes

Outcome Number	Way of testing
Knowledge	
W_01	Lectures – final colloquium, research project
W_02	Lectures – final colloquium
Skills	
U_01	Exercises – issues related to the use of data and building of the GIS data model, research project
U_02	Exercises – qualitative/ quantitative and spatial analyses
U_03	Exercises - issues related to the use of data and creation and conversion of data
U_04	Exercises – presentation of results, research project
U_05	Research project – evaluation of the conduct of the work
Social competences	
KS_01	Research project – group work, assessment based on the tutor's observation of the workshop work
KS_02	Project – design concept, evaluation of workshop outcomes: design charrettes

Literature
Basic:
- Amoroso N.: The Exposed City: Mapping the Urban Invisibles, New York: Routledge, 2010
- Gaździcki J.: Leksykon Geomatyczny, Polskie Towarzystwo Informacji Przestrzennej, Warszawa 2001
- Guhathakurta, S.; Urban modeling as storytelling: using simulation models as a narrative. In Environment and Planning B: Planning and Design 2002, Volume 29, pp. 895-911
- Hillier B.; Space is the machine, Space Syntax, 2007, www.spacesyntax.com
- P. Kempf, You Are the City: Observation, Organization and Transformation of Urban Settings, Kösel, Germany: Lars Müller Publishers, 2010
- Korte G.B.: The Gis Book: Understanding the Value and Implementation of Geographic Information Systems, OnWord Press 1997
- Lynch K.: The Image of the City, MIT Press, Cambridge Massachusetts 1960
- Mitchell A.: Zeroing In - Geographic Information Systems at Work in the Community, Esri Press 1999
- CASA University College London Working Papers: http://www.casa.ucl.ac.uk/publications/workingpapers.asp
- INSPIRE: http://inspire.jrc.ec.europa.eu/
- Plan4All : http://www.plan4all.eu/wiki/Main_Page

Complimentary:
- Batty M. , Hudson-Smith A.: Data mash-ups and the future of mapping, JISC: Technology & Standards Watch (TechWatch) 2010, Available at: http://www.jisc.ac.uk/techwatch [Accessed November 20, 2011].
- Brail R. K., Klosterman R. E. red.: Planning Support Systems: Integrating Geographic Information Systems, Models and Visualization Tools, ESRI Press Redlands California 2001
- Charvat, K., Alberts, M., Horakova, S. : INSPIRE , GMES and GEOSS Activities, Methods and Tools towards a Single Information Space in Europe for the Environment. Methods. Riga 2009: Tehnoloģiju attīstības forums Wirelessinfo.
- Joshi P.K., Pani P., Mohapartra S.N., T.P. Singh (red.): Geoinformatics for Natural Resource Management, Nova Publishers, New York 2009
- Mitchell W.J.: City of Bits, Massachusetts Institute of Technology, Cambridge 1996
- Mitchell W.J.: E-topia, Massachusetts Institute of Technology, Cambridge 2000
- Mitchell W.J.: Me++, The MIT Press, Cambridge Massachusetts, London England 2003
- Nold Ch., Ed. Emotional Cartography, Technologies of the Self, 2009, http://emotionalcartography.net/

- Panerai P., Depaule J. Ch., Demorgon M. : Analyse urbaine, Marseille: Édition Parenthèses, 2009
- Current Internet sources and research publications, including:
- Urban Informatics Research Lab at Queensland University of Technology, http://www.urbaninformatics.net
- Towards the Sentient City Project, http://www.sentientcity.net
- MIT Senseable City Lab, http://senseable.mit.edu/
- Gartner, G.; EmoMap Project, Technische Universität Wien, Institut für Geoinformation und Kartographie: OpenEmotionMap.org, http://www2.ffg.at/verkehr/projekte.php?id=754&lang=en&browse=programm