



### MODULE SPECIFICATION

Module code	
Module title in Polish	<b>Kartografia i wizualizacje tematyczne</b>
Module title in English	<b>Cartography and Thematic Visualizations</b>
Module running from the academic year	<b>2016/2017</b>

### A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	<b>Surveying and Cartography</b>
Level of qualification	<b>first cycle</b> (first cycle, second cycle)
Programme type	<b>academic</b> (academic/practical)
Mode of study	<b>full-time</b> (full-time/part-time)
Specialism	<b>all</b>
Organisational unit responsible for module delivery	<b>The Department of Geotechnical Engineering, Geomatics and Waste Management</b>
Module co-ordinator	<b>Prof. Jacek Szewczyk, PhD hab., Eng.</b>
Approved by:	<b>Ryszard Florek-Paszkowski, PhD, Eng.</b>

### B. MODULE OVERVIEW

Module type	<b>core module</b> (core/programme-specific/elective HES*)
Module status	<b>compulsory module</b> (compulsory/optional)
Language of module delivery	<b>English</b>
Semester in the programme of study in which the module is taught	<b>semester 4</b>
Semester in the academic year in which the module is taught	<b>summer semester</b> (winter semester/summer semester)
Pre-requisites	<b>None</b> (module code/module title, where appropriate)
Examination required	<b>No</b> (Yes/No)
ECTS credits	<b>4</b>

\* elective HES – elective modules in the Humanities and Economic and Social Sciences

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per	15		30		



# Politechnika Świętokrzyska

## WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI

semester					
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### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aim of the module is to familiarise students with knowledge on the fundamentals and the process of preparing a map (including a digital map with the geovisualization methods, the contents of general geographical and thematic maps).
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student has knowledge which is useful to formulate and solve basic cartographic tasks.	l/l	GiK_W01	T1A_W01
W_02	A student knows basic principles of digital cartographic generalisation, databases, topographical objects, and NMT bases; moreover, a student knows the principles of editing general geographic and thematic maps (together with the principles of geovisualising them).	l/l	GiK_W06	T1A_W02, T1A_W03
W_03	A student has basic knowledge on spherical trigonometry; furthermore, a student knows the applied spatial reference systems, reference points, cartographic projection (together with the appropriate coordinate systems applied in office preparations in Poland).	l/l	GiK_W10	T1A_W03
W_04	A student has knowledge on theoretical fundamentals of defining and realising astronomical, surveying, and cartography coordinate systems.	l	GiK_W15	T1A_W03, T1A_W04, T1A_W05, TA1_W07
W_05	A student is familiar with the principles of the surveying and cartographic production process automation (from the stage of obtaining information on the terrains to the stage of their graphical presentation).	l	GiK_W17	T1A_W03; T1A_W04; T1A_W07
W_06	A student knows basic methods, techniques, and tools applied while solving tasks as regards cartography.	l/l	GiK_W27	T1A_W07
W_07	A student has knowledge as regards the cartography law and standard techniques binding in cartography.	l	GiK_W09	T1A_W03
W_08	A student is familiar with the principles of completing or updating topographic maps in the whole scale series as well as general geographical maps; in addition, a student is acquainted with the principles of cartographic reproduction and preparing maps for printing.	l/l	GiK_W32	T1A_W03
U_01	A student is able to prepare and present (both in Polish and in a foreign language) an engineering problems as regards cartography.	l	GiK_U04	T1A_U01, T1A_U06
U_02	A student has substantive and methodological background for thematic presentations as regards cartography.	l	GiK_U08	T1A_U04, T1A_U06
U_03	A student can (irrespective of the objective) select cartographic visualisation methods; a student can also make a correct cartographic visualisation; furthermore, a student is able to edit general geographic and thematic maps in digital and analogue technology.	l	GiK_U09	T1A_U07
U_04	A student is able to converse coordinates between spherical, spatial, and cartographic coordinate systems applied in official elaborations; a student is also able to select cartographic	l	GiK_U10	T1A_U07, T1A_U08



	reference optimally.			
U_05	A student can make basic calculations on a rotational ellipsoid; furthermore, a student can make a transformation between coordinate systems; a student can also calculate the coordinates and make reduction in cartographic projection.	I	GiK_U29	T1A_U07, T1A_U08
U_06	A student can conduct the generalisation of databases concerning topographic objects for standard cartographic elaborations.	I	GiK_U31	T1A_U08
U_07	A student can compare and assess cartographic elaborations; moreover, a student can select appropriate cartographic products or its elements as a reference for thematic elaborations.	I	GiK_U32	T1A_U08
K_01	A student understands and knows the possibilities of continuous education as well as raising his/her qualifications.	I	GiK_K01	T1A_K01
K_02	A student is aware of the necessity of self-education as well as acting in a professional and responsible manner (and according to the principles of professional ethics).	I	GiK_K02	T1A_K01, T1A_K02, T1A_K05, T1A_K07
K_03	A student can co-operate and work in a team during the realisation of various engineering projects.	I	GiK_K07	T1A_K03
K_04	A student has competences as regards forming map editing teams and managing them.	I	GiK_K11	T1A_K03

### Module content:

#### 1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1 - 2.	A model of a cartographic information broadcast. Cognitive cartography and cartographic semiotics. Map use. The concept of geovisualization. The forms of geovisualization. The classification of maps. Map types.	W_01, K_01
3.	The cartographic law, norms and technical standards binding in cartography.	W_07
4 - 5.	Space in cartography. Surveying fundamentals of cartography. Map features. Reference surfaces.	W_03, W_04
6 - 7.	References, coordinate systems. Map scale. A system of conventional signs. Mathematical cartography. Converting coordinates in various systems. The transformation of coordinates.	W_03, W_04
8.	Cartographic generalisations. Databases of topographical objects and NMT bases.	W_02, W_06
9.	A digital map. A digital cartographic model. Topographic surfaces. Operations on topographic surfaces.	W_05
10 - 11.	Mapping methods. Thematic maps. Designing thematic maps and designing principles.	W_02, K_02
12 - 13.	Geovisual presentations. The methods of presenting land relief. Multimedia cartography. Multimedia atlases. A mobile cartography.	W_06, K_01
14 - 15.	Updating topographic maps. Cartographic reproduction, preparing maps for print.	W_08

#### 2. Topics to be covered in the laboratories

No.	Topics	Module outcome code
1	Spherical trigonometry. Solving tasks on a curved surface.	U_04, W_01, W_03
2, 3	The transformation of coordinates (Helmert and affinity). Hausbrandt's corrections.	U_04, W_03
4	Converting coordinates in various systems.	W_06, U_04, U_05



5	Converting spherical coordinates (mathematical cartography).	W_06, U_05
6,7	Preparing a vector digital map in the selected computer program for various references.	U_03, U_04
8, 9	Map digitalisation. Creating vector maps.	U_03
10, 11	Zooming out maps, details generalization (including the automatic one).	W_02, U_06
12, 13	Databases for creating a digital map.	W_05, U_03, K_03
14, 15	Preparing a digital thematic map (teamwork). Selecting a visualization method and completing it.	U_01, U_02, U_03, U_07, K_03, K_04

### Assessment methods

Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01- W_08	A final test (a written test)
U_01 - U_07	Completing tasks during laboratory classes
K_01 - K_04	Completing tasks and team projects, observing a student's involvement during the classes



### D. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	15
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	30
4	Contact hours: attendance at office hours (2-3 appointments per semester)	5
5	Contact hours: participation in project-based classes	-
6	Contact hours: meetings with a project module leader	-
7	Contact hours: attendance at an examination	
8		
9	<b>Number of contact hours</b>	<b>50</b> <i>(total)</i>
10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>2.0</b>
11	Private study hours: background reading for lectures	5
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	5
14	Private study hours: preparation for laboratories	15
15	Private study hours: writing reports	15
16	Private study hours: preparation for a final test in laboratories	10
17	Private study hours: preparation of a project/a design specification	-
18	Private study hours: preparation for an examination	
19		
20	<b>Number of private study hours</b>	<b>50</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>2.0</b>
22	<b>Total study time</b>	<b>100</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>4</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	<b>70</b>
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>2.8</b>

### E. READING LIST

References	
	1. Kraak M.-J., Ormeling F., <i>Cartography: Visualization of Geospatial Data</i> , Pearson Education Limited, Kraak M.-J., London 2010.
	2. Lehmann E., Ogrissek R., <i>Thematic Cartography</i> [in:] <i>Basic cartography for students and technicians</i> , pp. 85-104, 1988.
	3. MacEachern A.M., Taylor D.R., <i>Visualization in Modern Cartography</i> , Oxford, Pergamon 1-12, 1994
	4. Robinson A.H., Morrison J.L., Muehrecke P.C., Kimerling A.J., Gupta S.C., <i>Elements of Cartography</i> , ed. 6, Wiley, New York, 1995.
	5. Slocum T.A., McMaster R.B., Kessler F.C., Howard H.H., <i>Thematic Cartography and</i>



# Politechnika Świętokrzyska

**WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI**

	<i>Geographic Visualization</i> , ed. 3, Pearson Prentice Hall, Upper Saddle River, 2010.
Module website	