UNIVERSITY
OF WARMIA AND MAZURY
IN OLSZTYN

Faculty of Geodesy, Geospatial and Civil Engineering

Course title: GEODESY (SURVEYING) WITH GEOMATICS (spring semester)

ECTS credit allocation (and other scores): 4

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45 hours of classes and 15 hours of lectures

Course coordinator/ Department and e-mail: Adam Doskocz, Department of Geodesy, adam.doskocz@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Preliminary topics of the classes. Development of assumptions of the horizontal control network or of the modernization of a horizontal detailed control networks by contemporary measurement techniques (traverse method, angular-linear intersection and resection, GNSS vectors). Use of traverse method for horizontal control network and for other engineering purposes and analyses of their accuracy. Total station: determining the instrument-reflector constant by field method and the horizontal collimation error and the vertical index error. Determination of elevation of the inaccessible point by means of trigonometric leveling. Measurement of traverse by the method of three-tripod traversing. Setting of double-functional (horizontal and vertical) surveying control points via traversing and geometric levelling. Resection of the point by total station via free station method. Use of total station for topographic surveys. GNSS surveying by RTK or RTN techniques. Digital map data acquisition from field measurements with codes describing the features. Creation of digital base map.

LECTURES: Preliminary topics of the lectures. Introduction to issues of design and measurement of detailed horizontal control network. Discussion of the principles of developing a map of the horizontal control network project with use an analogue topographic map or raster image of the map as well as GEOPORTAL services and WMS services. Calculating of accuracy of the traversing and coordination of quality of angular and linear measurements. The method of trigonometric leveling in referring to the plane and theme of the checking the basic parameters of the total station for surveying. Use of three-tripod traversing method for traversing and guidelines for setting of double-functional (horizontal and vertical) surveying control points. Setting of 3D surveying control points by a three-point resection, so called "free stationing" of total station. Detail survey by total station and real time GNSS. Standards and guidelines of large scale map data acquisition and creating of raster and vector maps. Generate the digital terrain model (DTM) formed using GRID and TIN. Contouring based on DTMs. Principles of creation of digital base map and updates of data base and import or export of their objects.

Learning purpose: Ability to design detailed control network and realization of measurements and processing of results along with the preparation of a technical report. Competence in the systematics of state control networks and their accuracy analysis as well as effective use of the national spatial reference system. Skills in the topic of transformation of coordinates and solving intersections.

On completion of the study programme the graduate will gain:

Knowledge: Knowledge of coordinate systems used in surveying and instruments and their use as well as in measurement techniques. Classification of horizontal and vertical control network, detailed and survey network and realization of topographic survey. Data evaluation and their accuracy estimation, as well as automation of measurements and compilation of digital and analogue maps.

Skills: Skills to design detailed control network and realization of levelling and topographic survey. Use of electronic and classical instruments in measurements. Data evaluation and compilation of maps.

Social Competencies: Competencies to interact and work in a team, assuming different roles and indicate accordingly priorities for carrying out the task set out and think and act rationally.

Basic literature:
LITERATURE IN POLISH:
LAZZARINI T. (red.), Geodezja. Geodezyjna Osnowa Szczegółowa, PPWK, 1992. SKÓRCZYŃSKI A.M., Niwelacja trygonometryczna w pomiarach szczegółowych, Wydawnictwo PW, 2000. SKÓRCZYŃSKI A.M., Poligonizacja, Wydawnictwo PW, 2000. SKÓRCZYŃSKI A.M., Lokalna triangulacja i trilateracja, Wydawnictwo PW, 2004. JAGIELSKI A., Geodezja II, P.W. STABIL., 2003. JAGIELSKI A., Przewodnik do ćwiczeń z geodezji II, GEODPIS, 2006. LAMPARSKI J., ŚWIĄTEK K., GPS w praktyce geodezyjnej, GALL, 2007. OSADA E., Osnowy geodezyjne, UxLAN Wrocław, 2014. OSADA E., Geodezyjne układy odniesienia, UxLAN Wrocław, 2014. OSADA E., Geodezyjne pomiary szczegółowe, UxLAN Wrocław, 2014. GAŹDZICKI J. (red.), Leksykon geomatyczny, http://www.ptip.org.pl, 2002. GUGiK, Obowiązujące w dziedzinie geodezji i kartografii akty prawne oraz standardy techniczne, http://isap.sejm.gov.pl, 1989.

Supplementary literature:
LITERATURE IN ENGLISH (for example):
Charles D. Ghilani and Paul R. Wolf, Elementary Surveying: An Introduction to Geomatics, 15th Edition, 2017.
Jack C. McCormac, Surveying, 6th Edition, 2012.
Frederic P. Miller, Agnes F. Vandome and John McBrewster, Geomatics, 2010.
Barry F. Kavanagh, Surveying: Principles and Applications, 8th Edition, 2008.

The allocated number of ECTS points consists of: 4 (100 hours)

Contact hours with an academic teacher: 63 hours.

Student's independent work: 37 hours.