



Course title: GEODETIC PRIMARY SURVEYS

ECTS credit allocation (and other scores): 3

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: 30

Course coordinator/ Department and e-mail: Wojciech Jarmolowski, PhD, WG, wojciech.jarmolowski@uwm.edu.pl

Type of classes: classes

Substantive content

CLASSES: Application of geometric and physical constants of GRS80 system. Helmert transformation between realizations of geocentric systems, i.e. ITRF, ETRF. Gauss-Kruger projection (2000 frame, UTM frame). Transformation of the global system to the topocentric system. Relations between natural and geodetic coordinates. Geoid, gravimetric reductions, gravity anomalies, deflection of the vertical. Height systems. Relations between the geometric and physical and height systems. Precise leveling traverse in the normal system of heights.

LECTURES: Terrestrial reference systems and frames (international ITRS system, European ETRS89 system), and measurement techniques applied in their realization. Relations between terrestrial reference frames (Helmert transformation, projections). National reference system and coordinate systems. IGS, EPN, and ASG-EUPOS networks. Fundamental and primary first order national networks (geodetic, gravimetric, magnetic). Fundamentals of physical geodesy (gravity, height systems). Gravimetric measurements and the figure of the Earth. Precise leveling.

Learning purpose: Knowledge of geodetic terrestrial reference systems, understanding the relationships between the systems, knowledge on the primary geodetic surveys.

On completion of the study programme the graduate will gain:

Knowledge: Fundamental and primary geodetic horizontal and vertical systems and frames as well as their relations, principles of designing and establishing the control networks.

Skills: Transformations between fundamental and primary geodetic frames, calculation of fundamental map projections, application of necessary geometric and physical constants and formulas, surveying skills necessary in creation of primary networks.

Social Competencies: programming skills, working with data, working in group.

Basic literature:

Jekeli Christopher, Geometric Reference Systems in Geodesy, Tom 1, Wyd. Ohio State University, R. 2006, s. 202, http://mat.uc.pt/~gil/downloads/Geom_Ref_Sys_Geodesy.pdf

Vermeer M., Mathematical Geodesy, Tom 1, Wyd. https://users.aalto.fi/~mvermeer/geom_en.pdf, R. 2015, s. 127

Altamimi Z. et al., A new release of the International Terrestrial Reference Frame for earth science applications, Tom 107, Wyd. JOURNAL OF GEOPHYSICAL RESEARCH, R. 2002, s. B10, 2214



Altamimi Z. et al., ITRF2008: an improved solution of the international terrestrial reference frame, Tom 85, Wyd. Journal of Geodesy, R. 2011, s. 457–473

Altamimi Z. et al., ITRF2005: A new release of the International Terrestrial Reference Frame based on time series of station positions and Earth Orientation Parameters, Tom 112, Wyd. JOURNAL OF GEOPHYSICAL RESEARCH, R. 2007, s. B09401

Supplementary literature:

Vaniček P, An Online Tutorial in Geodesy, University of New Brunswick, 2001, pp. 47

Wahr J, Geodesy and Gravity, t. , University of Colorado. Boulder, Samizdat Press , pp. 1996.

Torge W., Geodesy, Walter de Gruyter, 1991, pp. 416

The allocated number of ECTS points consists of:

Contact hours with an academic teacher:

Student's independent work: