UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Geoengineering

Course title: GNSS APPLICATIONS

ECTS credit allocation (and other scores): 4

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Grzegorz Grunwald, Ph.D., Institute of Geodesy, grzegorz.grunwald@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Determination of the kinematic GNSS position using various measurement techniques (autonomous, DGNSS, RTK, GPS/SBAS). Real-time positioning quality analysis, preparation of a report of actions performed. Performing the kinematic measurement in post-processing mode (autonomous, DGNSS, RTK). Analysis of positioning quality in post-processing mode, preparation of a report of actions performed. Integration of the GNSS receiver with other devices (GPR, inertial navigation system). Application of GNSS receivers in air, water and land navigation, agriculture and UAV.

LECTURES: Possibilities of satellite positioning systems application (LBS, road, aviation, rail, maritime, agriculture, surveying timing & sync.). SBAS systems (EGNOS, WAAS, SDCM, MSAS, QZSS). Aspects of kinematic GNSS positioning (autonomous, DGNSS, RTK, GPS/SBAS). Integration of GNSS measurements with other sensors (GPR, inertial navigation system, magnetometers, A-GPS, WiFi positioning, GNSS based mobile devices). Application of GNSS receivers in air, water and land navigation, agriculture and UAV. Quality parameters of GNSS positioning (accuracy, integrity, availability, continuity).

Learning purpose: Knowledge of the applications of satellite navigation systems.

On completion of the study programme the graduate will gain:

Knowledge: Has knowledge about modern applications of satellite navigation systems.

Skills: Is able to plan and carry out experiments related to the use of GNSS, interpret the obtained results, draw conclusions.

Social Competencies: Can interact and work in a group, taking on different roles.

Basic literature: 1) B. Hofmann-Wellenhof, GNSS Global Navigation Satellite Systems, Springer, 2008, t. I, pp. 350;

2) P. Misra, P. Enge, Global Positioning System - Signals, Measurements and Performance, Ganga-Jamuna Press, 2006, t. II, pp. 570

Supplementary literature: -

The allocated number of ECTS points consists of: 120

Contact hours with an academic teacher: 45

Student's independent work: 75