UNIVERSITY
WARMIA AND MAZURY IN OLSZTYN

Faculty of Geodesy, Geospatial and Civil Engineering

Course title: GNSS SURVEYING

ECTS credit allocation (and other scores): 2

Semester: spring

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

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 30

Course coordinator/ Department and e-mail: Marcin Uradziński, Ph.D., Institute of Geodesy and Civil Engineering, marcin.uradzinski@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Determining the static position of a satellite receiver using various measurement techniques (autonomous, DGNSS, differential positioning). Performing the development of observations in post-processing mode (autonomous, DGNSS, differential positioning). Data formats (RINEX, NMEA, RTCM, CMR, NTRIP). Determining the position of a mobile receiver in real time (autonomous, DGNSS, RTK). The use of reference station network in post-processing and real-time (single station, virtual reference station). Transformation of points coordinates determined using the GNSS receiver (ITRF, ETRF).

LECTURES: Satellite positioning systems (GPS, GLONASS, Galileo, Beidou, SBAS, regional systems) - orbital constellation, signal structure, services, reference system, time system, application. EGNOS system, its construction and application. Construction and application possibilities of GNSS receivers (GNSS receiver operations diagram, GNSS antennas). Code and phase GNSS positioning techniques (autonomous, DGNSS, differential positioning). Formats of GNSS measurement data (RINEX, NMEA, RTCM, CMR, NTRIP). National networks of GNSS reference stations (ASG-EUPOS, TPI NETPro, SmartNet).

Learning purpose: Understanding the operation of satellite systems used in geodesy and navigation.

On completion of the study programme the graduate will gain:

Knowledge: Defines the principles of architecture and operation of various GNSS systems.

Skills: Plans, implements and develops GNSS satellite observations using various techniques.

Social Competencies: - Is focused on expanding his knowledge related to the development of GNSS techniques.

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: 50

Contact hours with an academic teacher: 30

Student's independent work: 20