UNIVERSITY
WARMIA AND MAZURY IN OLSZTYN

Faculty of Geodesy, Geospatial and Civil Engineering

Course title: Satellite Geodesy

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: 45

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

Type of classes: classes and lectures

Substantive content

CLASSES: Planning an observation session for any observation point. Analysis of satellites over the observed point for a specified observation time. RINEX format, analysis of observation and navigation files. Converting files to RINEX format. Making a measurement using a single GNSS receiver. Analysis of absolute positioning accuracy. Performing absolute positioning calculations, based on code observations. Calculation of DOP coefficients. Operation of a geodetic GNSS receiver. Carrying out field measurement and alignment of GNSS observations. Developing GNSS observations using commercial software. Developing static measurements using the ASG-EUPOS system. Alignment of GNSS networks. Transformation of GNSS measurement results to arbitrary coordinate systems. Geodetic receivers for real-time measurements. Configuration of RTK mobile station in relation to any reference station systems. Execution of RTK measurements.

LECTURES: GPS system. Constellation of satellites. History of the system. Modernization of the GPS system. Structure of the current GPS signal. Code and phase observations at L1, L2 and L5 frequencies. Code measurements. Principle of measurement. Observation equation and error analysis. Mathematical model of GPS autonomous positioning. DOP precision coefficients (GDOP, PDOP,HDOP). Phase measurements. Principle of phase measurements and observation equations. Characteristics of GNSS positioning methods. Relative positioning. Stages of development of GNSS observations. ASG-EUPOS system. Transformations of coordinates from GNSS observations. Characteristics of the services of the ASG-EUPOS system. RTK positioning.

Learning purpose: Ability to carry out static GNSS and RTK measurements.

On completion of the study programme the graduate will gain:

Knowledge: Describes real-time and post-processing services of the reference systems. Understands network GNSS/RTK positioning. Knows the methodology of elaboration of GNSS observations.

Skills: The ability to carry out GNSS measurements for the establishment of geodetic control networks and the ability to perform RTK measurements of ground details and determination of points with given coordinates. coordinates.

Social Competencies: Works individually to carry out GNSS measurements.

Basic literature: 1) Hoffmann-Wellenhof B., GNSS Global Navigation Satellite Systems, Tom I, Wyd. Springer, R. 2008;

The allocated number of ECTS points consists of: 75

Contact hours with an academic teacher: 50

Student's independent work: 25