



Subject card

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| Subject name and code | Geodesy and geodetic astronomy, PG_00044833 | | | | | | |
| Field of study | Geodesy and Cartography | | | | | | |
| Date of commencement of studies | October 2021 | | Academic year of realisation of subject | | 2023/2024 | | |
| Education level | first-cycle studies | | Subject group | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 3 | | Language of instruction | | Polish | | |
| Semester of study | 5 | | ECTS credits | | 2.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Geodesy -> Faculty of Civil and Environmental Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Jerzy Pyrchla | | | | |
| | Teachers | | dr hab. inż. Jerzy Pyrchla | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 15.0 | 0.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 30 | | 6.0 | | 14.0 | 50 |
| Subject objectives | After the course, the student has the knowledge and abilities to solve geodetic problems on the sphere, ellipsoid with the use of novel technology and measurement systems. Student acquainted the methodology of the Earth shape estimation using gravimetric methods knows the influence of the gravitational field on the geodetic measurements and knows the different height system. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W06] has a well-grounded knowledge and understands geodesy concepts including the main methods of obtaining data about space together with the surveying and computational methods, which from the one hand are compatible with the current legal status and from the other hand refer to measurements on the plane and cover the use of modern geodetic instruments, with taking into account the curvature of the Earth and the impact of gravity on the manner of measurements and results | | The student is able to use different reference systems and coordinate frames used in geodesy, geodynamics, satellite geodesy and astronomy. | | | | |
| | [K6_U06] can solve geodetic tasks and select measurement methods for typical engineering tasks including the curvature of the Earth and the impact of gravity | | Can use knowledge from the field of mathematics and phisicks in the higher geodesy. | | | | |
| Subject contents | Spherical trigonometry: trigonometric line, properties of a spherical triangle, sinus theorem, cosine theorem for side and for angles, tangents theorem. Brod formulas, Neper analogies. Spherical excess. Field of the spherical triangle. Introduction to higher geodesy: division of geodesy, the shape of the Earth, reference surfaces, geodetic networks. Flattered rotational ellipsoid as a reference surface: elementary relationships between ellipsoid parameters, geodetic coordinates system, normal sections of the ellipsoid and its curvatures, geocentric latitude, reduced latitude, parametric equation of the ellipsoid, geodetic line on the surface of the rotational ellipsoid. Translation of geographical coordinates on the surface of the rotational ellipsoid. Introduction to physical geodesy: gravity force, level surfaces, plumb lines, height. Reference system, coordinate frames used in the geodesy—definitions and mutual relations. | | | | | | |

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| Prerequisites and co-requisites | High school level. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | | 100.0% | 100.0% |
| Recommended reading | Basic literature | Barlik M., Pachuta A. Pruszyńska-Wojciechowska M.: Ćwiczenia z geodezji fizycznej i grawimetrii geodezyjnej; Wydawnictwa Politechniki Warszawskiej, Warszawa 1992; Barlik M.: Pomiary grawimetryczne w geodezji; WPW, Warszawa 1996; Barlik M.: Wstęp do teorii figury Ziemi; WPW, Warszawa 1995; Barlik M., Pachuta A.: Geodezja fizyczna i grawimetria geodezyjna; Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2007; Czarnecki K.: Geodezja współczesna w zarysie; Wiedza i Życie Warszawa 1996; Hlibowicki R. i inni: Geodezja Wyższa i Astronomia Geodezyjna; PWN, Warszawa 1981; | |
| | Supplementary literature | The current article in higher geodesy from Polish and international journals. For example: Journal of Geodesy; Marine Geophysical Research; Journal of Geodynamics; Journal of the Geodetic Society of Japan | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | What is the subject of higher geodesy? Basic properties of the spherical triangle. Scope of application for spherical trigonometry equations. Give the definition and characterise basic reference surfaces in geodesy. Basic parameters and quantities characterising the flattened rotational ellipsoid. Application of the Clairaut, Euler and Meusnier formulas in the geodetic calculation. Geodetic line. Clark's algorithm. Principles of the Earth shape estimation using gravimetric methods. The influence of the gravitational field on the geodetic measurements. | | |
| Work placement | Not applicable | | |