COURSE		**FUNDAMENTAL GEODETIC WORKS**		
LECTURER		Assist. Prof. Medžida Mulić Ph.D.		
STUDY	***STATUS***	***SEMESTER***	***NUMBER OF LESSONS L+E***	***ECTS***
B – G	Compulsory	6	2+2	5

OBJECTIVES

- Developing knowledge about old local and contemporary global reference standards in the state geodetic survey; positional, vertical and gravimetric reference coordinate systems and the associated geodetic datums, as well as knowlidge and skills in the geodetic surveying, data processing, adjucement and quality control of the contemporary fundamental geodetic networks in Bosnia and Herzegovina and Europe.

LEARNING OUTCOMES

After that course students will:

- be familiar with legacy (old) local and modern global standards in the field of state/cadastre survey.
- gain deep understanding of way how positional (horizontal), vertical and gravimetric reference networks and associated datum were realised.
- apply formulas and algorithm to do calculation on reference ellipsoid.
- gain advanced knowledge and skills to survey, processing and adjusting data.
- apply knowledge to do assessment and quality control of old and modern geodetic fundamental networks in West Balkan counties and Europe.

COURSE CONTENT

- Definition and classification of geodesy, basic surfaces in advanced geodesy. State geodetic survey, the purpose and significance of triangulation, trilateration, leveling, gravimetry, geodetic astronomy. Modern methods of positioning: GPS, Doppler, and laser interferometric measurements. Inertial systems. Coordinate systems: global geocentric, local ellipsoid and topocentric and their relationships. Surveying datum.
- Basics of the ellipsoidal geodesy. The establishment of state coordinate systems and coordinate transformations. Positional network of permanent geodetic points. Design of the positioning network on the state level, the city's positioning network, the principle of optimization of geodetic networks. Scale of the network determination. Electronic measuring of distances, corrections and reductions. GPS measuring of distances. Position datum. Adjustment of networks.
- Mathematical models of the ellipsoid, the balls and the projection plane. Network adjustment after conditional measurements. Network adjustment by indirect networks. The combined network adjustment with classic and GPS measurements. Core Network constant height points. Heights systems: geopotential, orthometric, normal, normal-orthometric and dynamic systems of heights. Mutual relations and transformation of height systems. Fundamental state leveling network, UELN and EUVN. Vertical datum. Adjucement models of leveling networks. Trigonometric leveling. Transfer the height by combination of GPS and the geoid. Gravimetric network and gravimetric datum.

RECOMMENDED LITERATURE

- Torge, W.: Geodesy, 3rd Edition, Walter de Gruyter, 2001
- Muminagić, A.: Viša geodezija I (Advanced geodesy I), Faculty of Civil Engineering UNSA, 1981.
- Muminagić, A.: Viša geodezija II (Advanced geodesy II), Faculty of Civil Engineering UNSA, 1985.
- Vaníček, P. and Krakiwsky, E.J.: Geodesy: The Concepts. North-Holland, Amsterdam, 1982, 691 pages.

Exam and scoring is organised as:

Homeworks, pracical exercises and report are scored as 20 points in total.

During the semester the exam is taken in two parts in writing. Each part is scored as follows: (two midterm exams) - 40 points, a total of 80 points.

a) If a student realizes 55% of both parts the final score to be scaled in accorance by the Law on Higher Education.
b) Students who pass one part, on the final exam take in writing the part not passed.
c) Students who do not pass any part during the semester take the exam in writing as integral final exam.