

Geodesy at the University of Zagreb

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Abstract

This year marks the 350th anniversary of the University of Zagreb and the 100th anniversary of the Technical Higher School in Zagreb. Geodesy (geo- + Greek $\delta\alpha\acute{\iota}\omega$, $\delta\alpha\epsilon\acute{\iota}\omega$: to learn, to know, to find out) is a technique and science that deals with the measurement and representation of the physical Earth's surface, determining the shape of the Earth and its gravitational field. The main subject of research in geodesy is the geodetic survey of land and the Earth. The basic branches of geodesy are applied geodesy, satellite, physical and maritime geodesy, photogrammetry and remote sensing, and cartography, which are all brought together in geoinformatics.

A special place in the history of geodesy belongs to Ruđer Bošković. It is not widely known that he devoted part of his life to geodesy. The results of his measurements of the length of the meridian arc between Rome and Rimini in 1750–52 were published in 1755 in the scientific report *De litteraria expeditione per Pontificiam ditionem...* a work of more than 500 pages, with the *Nuova carta geografica dello Stato Ecclesiastico*. This, his major geodetic work, was translated in 1770 into French as *Voyage astronomique et géographique, dans l'Etat de l'Eglise ...* Bošković was the first to conclude that Earth's shape was irregular. He suspected that meridians were not ellipses, and confirmed this through his measurements. He theorised that the shape of the Earth was not only irregular but also variable in time, which was only proved much later. Bošković set out the theory of isostasy and was the first in the history of science to set up a method of adjusting the results of measurements by establishing the conditions that were later expressed in analytical form by P. S. Laplace.

Higher education in geodesy began to be conducted at the University of Zagreb almost two and a half centuries ago, as evidenced by Martin Sabolović's textbook *Exercitationes Gaeodeticae*, published in Latin in 1775. In 1811, the first diplomas were awarded to young academics who passed the prescribed exams at the Zadar Lyceum, on the basis of which they obtained academic degrees and the authority to act in the Illyrian provinces as geodetic surveyors. As a result, in 1811, Croatia had its first three graduate geodetic surveyors. In 1898, the Academy of Forestry was founded at the Faculty of Philosophy at the University of Zagreb. Geodesy was taught there, among other technical subjects. In 1908, a special Geodesy Course was introduced at the Academy of Forestry, where Oton Kučera taught mathematics, physics and spherical astronomy, Marije Kiseljak mathematics, David Segen descriptive geometry, Vinko Hlavnika geodesy, adjustment by the method of least squares, and triangular and polygonal measurements, Pavle Horvat geodesy, the technical supervisor Schmied cadastral survey, administrative aspect, cadastral records, land registers and agrarian operations, Vinko Krišković private and administrative law, Julije Roauer national economy, and Oto Frangeš field economy. The Geodesy Course, whose 'scientific basis' was exactly the same as the curricula of geodetic studies at colleges in Prague and Vienna, operated at the Academy of Forestry until 1920, when it became part of the Department of Geodesy of the Higher Technical School, established in 1919.

Today, geodesy and geoinformatics are studied and researched at the Faculty of Geodesy, University of Zagreb.

Keywords: geodesy, University of Zagreb, Technical Higher School in Zagreb