ЦЕНТЪР ЗА ОБУЧЕНИЕ – БАН

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Basic Information

Course Title: Fundamentals of geodetic coordinate and height systems, map projections, and their use in practice

Lecturer: Assoc. Prof. Eng. Lyubka Pashova, PhD
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Total Teaching Hours: 30 academic hours: lectures – 20 hours; practical classes – 10 hours

Annotation

The training course is intended for doctoral students to acquire knowledge of basic concepts related to geodetic reference coordinate and height systems, their implementation, and their use for solving practical problems. The principles for defining, implementing, and maintaining terrestrial reference coordinate systems will be explained at the global, regional, and national levels. Knowledge will be gained about using geodetic coordinate systems to depict the Earth's surface on a plane and about the most commonly used map projections in practice. The types of coordinate transformations and conversions and their integration into various software programs used in geosciences will be discussed. Exercises for solving test problems using data from geodetic practice in Bulgaria will be provided. The training is intended for doctoral students studying earth sciences, natural sciences, and engineering.

Course content

Module 1: Geodetic Reference Coordinate and Height Systems

- Basic Conventional Parameters (Datum) for Defining a GRS
- Types of Geodetic Reference Coordinate Systems (GRCS)
- Methods for Implementing a GRCS
- Coordinate Transformations Between GRCS

Module 2: Projection Coordinate Systems and Map Projections

- Coordinate Transformations and Coordinate Conversions
- Types of Map Projections
- Standards for GRCS Metadata and EPGS Codes

Module 3: Practical Implementation and Use of GRCS

- Integration of Geospatial Data from Various Sources
- Software for Coordinate Transformations and Conversions
- Practical Applications – Engineering Geodesy, GIS and Mapping, Environmental Monitoring, Precision Agriculture, Natural Disasters, etc.
- Working with Geoportals Providing Geospatial Information

Teaching and assessment methods

- 20 hours of lectures and 10 hours of exercises
- Development of a course assignment and interview

Competencies acquired as a result of training

The learners will gain knowledge about:

- The datum parameters required to define a GRS and explain the implications of choosing a specific reference ellipsoid;
- Coordinate transformations between different geodetic coordinate systems and EPSG codes for specific regional map projections;
- Types of cartographic projects and specific requirements for their selection when depicting a certain territory;
- Methods for identifying and establishing spatial offsets when integrating geospatial data into a GIS environment from various sources in different GRCS;
- Use of specialized software for coordinate transformations between different geodetic coordinate and height systems used in Bulgaria.

Literature:

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Additional information

Doctoral students should have a good mathematical background and be fluent in English.