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ON THE TRAINING OF SPECIALISTS IN THE CREATION AND MAINTENANCE OF SOFTWARE FOR PROCESSING AND PRESENTATION OF GEOSPATIAL DATA

Показана актуальність відкриття підготовки в вузах Білорусі програмістів геодезичного профілю.

The relevance of the opening of training in the universities of Belarus for geodetic programmers is shown.

Keywords: information technology, geodesy, cartography, land management, programming, geomatics, big data.

The modern world has taken a digital path of development, and nobody denies that the fourth industrial revolution (Industry 4.0), which is based on the global internetization of science and sectors of the national economy, has begun and is rapidly developing. It affected all spheres of human life: science, industry, geodesy, education, health care, agriculture, land use, etc.

Geodesy as the main provider of geospatial data (angular, linear, altitude, gravimetric, satellite measurements on the Earth's surface; remote sensing data of our planet from spacecraft, aircraft and unmanned aerial vehicles; coordinate reference systems and their implementation in the form of geodetic networks of various levels fixed on the ground etc.), together with geomatics, create and manage powerful geographic information bases related to the category of big data with their well-known problems [1-5].

It is clear that the presence of a large array of information in geodesy, photogrammetry and cartography, requiring rigorous mathematical processing, creating models of the Earth, modeling complex natural processes, for example, geodynamic processes, is in dire need of highly qualified programmers. But these programmers must be specialized, sharpened for solving geodetic problems.

However, in modern higher education in Belarus, as well as in other post-Soviet states, the methods of teaching programming still do not take into account the directions of training specialists [6]. Almost everywhere a unified classical scheme of teaching programming is used, built on the basis of solving problems of logic and higher mathematics. The most popular programming language for solving geodetic problems, C ++, is taught little or not at all when training programmers according to this classical scheme. It is not right. The training of a geodesist, along with the disciplines of working with ready-made software products, should be accompanied by the study of programming. Experience shows that a geodesist can be taught to program, but a programmer to teach geodesy is almost impossible.

Considering the globalization of the world economy with its emphasis on the digital world and the increasing role of geodesy in this world as a guarantor of ordering information arrays by the ability to coordinate space, it seems necessary to open training for specialists in the creation and maintenance of software for processing and presenting geospatial information (geodetic, photogrammetric (aerial and cosmophotographs), gravimetric, land cadastral, topographic, cartographic), including the organization and management of geospatial databases, at universities and departments that train geodesists, photogrammetrists, land surveyors and cartographers.

Topographic, geodetic and cartographic production in Belarus, as well as the main consumers of their products (builders, military, land surveyors, transport workers, etc.) widely use foreign software (ArcGis software (USA), PHOTOMOD (Russia), Bernese software (Switzerland), software "Trimble Business Center" (USA), etc.) for processing geospatial information and get the

products necessary for practical use (coordinates, heights, topographic maps, atlases, etc.) often according to closed algorithms laid down in foreign software.

Specializing in the creation of software for solving engineering problems, including geodetic and survey, CREDO-DIALOGUE (Minsk) is forced to attract programmers who do not know the intricacies of geodetic directions (geodesy, photogrammetry, topography, cartography), which also creates certain difficulties both programmers and users (surveyors, cartographers, photogrammetrists and land surveyors).

In addition, at enterprises performing geodetic and cartographic work, the following areas are relevant:

- automation of applied tasks using built-in programming languages based on existing software;
- adaptation and customization of software for processing and analysis of geospatial data;
- application of web technologies and distributed processing of geoinformation.

To solve these problems, knowledge of both geodesy and cartography and applied programming is required.

Department of Geodesy and Geoinformation Systems of Polotsk State University, which has extensive training experience in specialty 56 02 01 "Geodesy" with specializations "Photogrammetry", "Geodetic support of cadastres", as well as specialty "Geography. Geoinformation Systems" plans to train geodetic programmers, which seems timely and very relevant.

The curriculum of the opened specialty in the cycles of natural science, professional and special disciplines provides 55% of disciplines in programming and 45% of disciplines in geodesy (geodesy, topography, cartography, photogrammetry, higher geodesy, etc.).

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РОЗВИТОК НЕТРАДИЦІЙНОГО ЗЕМЛЕКОРИСТУВАННЯ ЯК ПЕРЕДУМОВА ЕКОЛОГІЧНОЇ МОДЕРНІЗАЦІЇ СІЛЬСЬКОГОСПОДАРСЬКОГО ВИРОБНИЦТВА

Досліджено ефективність використання сільськогосподарських земель України через оцінювання питомої ваги соняшника в структурі посівів. Результати дослідження свідчать про доцільність розвитку нетрадиційного землекористування.

Ключові слова: нетрадиційне землекористування; органічна продукція; нішева продукція; екологізація та капіталізація землекористування; екологічна модернізація.