Faculty of Geoengineering

Course title: DATABASE DESIGN

ECTS credit allocation (and other scores): 3

Semester: spring

Level of study: ISCED-7- long-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Michał Bednarczyk Ph. D., Institute of Geodesy, michal.bednarczyk@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Introduction to SQL language, general syntax, data search (SELECT), filtering (WHERE), ordering (ORDER BY). Built in SQL functions, basic functions operating on individual records (character, numeric and date functions), agregation functions (SUM, MIN, MAX, AVG, COUNT). Tables joining. Subqueries (ordinary and correlated). Operations on spatial data using SQL, elements of spatial analysis and data processing. Data manipulation language (DML), enabling inserting, modifying and deleting data from tables (INSERT, UPDATE and DELETE commands). PL / SQL language, procedural programming mechanisms, program syntax in PL / SQL language, definition of variables and constants, basic control constructions (loops, conditional statements), cursors and exceptions mechanisms, programming of procedures and functions.

LECTURES: Introduction to databases. Database management systems. The role of spatial database management systems in GIS. Modeling of conceptual schemes and implementation schemes in the relational database model. Execution and optimization of queries in database systems. Spatial databases, spatial data representation, data formats, processing and analysis. Elements of programming in PL / SQL.

Learning purpose: The aim is to familiarize students with issues related to the design and creation of databases, including spatial databases. As part of the course, students become familiar with the basic principles of modeling and designing databases, relational data model, standard databases language (SQL) and basics of logical organization and physical structures used in database systems, including spatial databases.

On completion of the study programme the graduate will gain:

Knowledge: (The student has extended knowledge in the field of programming, designing and running geoinformation databases.

Skills: The student is able to design database structure, including spatial database. He can update, manage and share data in the system. He is able to use appropriate IT tools for this purpose.

Social Competencies: The graduate is open to technical innovations and innovative solutions in the field of geoinformatics.

Basic literature:

1) Date C. J.,, An Introduction to Database System, wyd. Adison-Wesley Pub. Comp., również WNT – W-wa,

2000, 2000, t. II ; 2) Garcia-Molina H., Ullman J.D., Widom J., Implementacja systemów baz danych, wyd. WNT,

2003 ; 3) Elmasri R., Navathe S., Wprowadzenie do systemów baz danych, wyd. Helion, 2005 ; 4) R. Coburn, SQL dla każdego, wyd. Helion, 2001 ; 5) B. Pribyl, S. Feuerstein, Oracle PL/SQL., wyd. Helion, 2001 ; 6) Shashi Shekhar and Sanjay Chawla, M. Gruber, SQL, wyd. Helion, 2003

Supplementary literature:

1) Elmasri R., Navathe S., Fundamentals of Database Systems, wyd. Adison-Wesley Pub. Comp., 2002 ; 2) M. Gruber, sql, wyd. Helion, 1996 ; 3) Philippe Rigaux, Michel Scholl, Agnes Voisard, Spatial Databases – With Application to GIS, wyd. Morgan Kaufman Publishers, 2002

The allocated number of ECTS points consists of: 75

Contact hours with an academic teacher: 50

Student's independent work: 25