COURSE INFORMATION LETTER

University: P. J. Šafárik University in Košice

Faculty: Faculty of Science

Course ID: ÚGE/ PAM1/21	**Course name:** Spatial analyses and modelling

Course type, scope and the method:
Course type: Lecture / Practice
Recommended course-load (hours):
Per week: 2 / 2 **Per study period:** 28 / 28
Course method:

Number of ECTS credits: 6

Recommended semester/trimester of the course: II. (Master)

Course level:

Prerequisities:

Conditions for course completion:
The evaluation is based on a combination of continuous tests in the lecture, submitted technical reports submitted at the exercises and the final exam. From the point of view of the organization of the subject, first the individual topics are taught at the theoretical and methodological level in lectures and then they are demonstrated in exercises on selected case studies and tasks.
Continuous control at the lecture with a weight of 20% is carried out through tests. During the semester, students take 2 tests focused on the computational solution of assigned tasks. From each test it is necessary to obtain a rating at least at the level of grade E.
The outputs from each exercise are passed on to the next exercise at the latest. During the semester, students will receive 2 separate assignments, the aim of which will be to apply selected methods of spatial analysis and modeling of spatial phenomena for a defined area of interest. The result will be a technical report containing a description of the data, methods and software used, analysis of the results and their interpretation. The technical report from these separate assignments represents 50% of the weight in the final evaluation, while it is necessary to obtain a minimum grade E level from each technical report.
A student who submitted all the results of the exercises on time and obtained an evaluation of both submitted technical reports at least at the level of grade E can apply for the exam. The final exam is carried out in the form of a test and weighs 30% overall at least at grade E.
The final evaluation is a weighted average of evaluations from continuous control (20%), submitted technical reports (50%) and exams (30%). Credits will only be awarded to a student who achieves a grade of at least E in each part of the assessment. Assessment scale: A (100-91%), B (81-90%,) C (71-80%), D (61- 70%), E (51-60%).

Learning outcomes:
Knowledge: The student will gain knowledge and overview in the concepts of spatial analysis and modeling of spatial phenomena using geodata in the geographic information system. They will get acquainted with the theoretical and methodological basis of selected spatial analyzes and approaches to modeling spatial phenomena.
Skills: The student will learn to prepare spatial data for spatial analysis and modeling of spatial phenomena. They will get acquainted with specialized software tools, modules and extensions for GIS. Can perform spatial analyzes and model selected spatial phenomena, evaluate the suitability of their use and interpret the results of spatial analysis and modeling of spatial phenomena.

Competences: The student is able to design a procedure for the analysis of spatial phenomena using geodata with a high degree of independence and evaluate the suitability of the methods used in their analysis.

Brief outline of the course:

Lectures:

Basic concepts of spatial analysis, their definition and classification; Point field analysis and spatial autocorrelation, distance analyzes; Graph theory and network analysis; Nuclear density analysis; Geographically weighted regression; Trend surface and multivariate spline; Geostatistical concept of spatial dependence; Spatio-temporal analysis and modeling, TimeGIS; Solar radiation modeling; Water flow and erosion modeling; Cellular automata; Fluid dynamics modeling

Exercises: Software tools for spatial analysis and modeling; Point field analysis and spatial autocorrelation, distance analyzes; Graph theory and network analysis; Nuclear density analysis; Geographically weighted regression; Trend surface and multivariate spline; Geostatistical concept of spatial dependence; Spatio-temporal analysis and modeling, TimeGIS; Solar radiation modeling; Water flow and erosion modeling; Cellular automata; Fluid dynamics modeling

Recommended literature:

KAŇUK, J., 2015. Priestorové analýzy a modelovanie. Vysokoškolské učebné texty. Prírodovedecká fakulta Univerzity Pavla Jozefa Šafárika v Košiciach. 114 s.

HLÁSNY, T. 2007: Geografické informačné systémy - Priestorové analýzy. Zephyros& Národné lesnícke centrum - Lesnícky výskumný ústav, Zvolen.

LLOYD, CH. 2009: Spatial Data Analysis. An Introduction for GIS users. Oxford University Press, Oxford.

BAILEY, T.C., GATRELL, A.C., 1995. Interactive spatial data analysis. Essex, Longman Scientific & Technical.

LONGLEY, P.A., BATTY, M. (eds.)., 2003. Advanced spatial analysis : the CASA book of GIS. Redlands, ESRI.

FISHER, M.M., LEUNG, Y. (2001). Geocomputational Modelling: techniques and applications. Berlin, Springer.

O'SULLIVAN, D.,UNWIN, D. (2002). Geographic Information Analysis. Wiley&Sons.

FISCHER, MM., GETTIS, A. (eds). (2010). Handbook of applied spatial analysis: software tools, methods and applications. Berlin, Springer.

FOTHERINGHAM, A. S., C. BRUNSDON, CHARLTON, M. (2000). Quantitative Geography: Perspectives on Spatial Data Analysis. Sage.

FOTHERINGHAM, S., ROGERSON, P. (1994). Spatial analysis and GIS. London, Taylor & Francis.

HAINING, R. P. (2003). Spatial data analysis: Theory and practice. New York: Cambridge University Press.

Course language:

Notes:

Course assessment

Total number of assessed students: 11

Course assessment is visible only in case of include the course to some study plan.

Provides: doc. RNDr. Ján Kaňuk, PhD.

Date of last modification: 23.11.2021

Approved: