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Basic Information:
Course Title: Spatial analysis and assessment of ecosystem services using GIS-based tools
Lecturer: prof. Stoyan Nedkov
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Email: snedkov@gmail.com
Total Teaching Hours: 30

Annotation (up to 150 words)

The main objective of the course is to teach PhD students about the basics of the concept of ecosystem services (ES), assessment methods and the possibilities of using GIS-based applications in mapping and mapping them. The course is structured in three main modules: 1) Introduction to the concept of ecosystem services; 2) Mapping and assessment of ecosystem services; 3) GIS-based applications and approaches for mapping and assessment of ecosystem services. Course participants acquire knowledge about the basics of defining ecosystem services, their classification, supply and demand, methods for biophysical, social and economic assessment, tools for GIS based mapping. You will acquire skills in working with spatial data with a full assessment and creating maps of ecosystem services in a GIS environment, as well as skills in working with specialized applications.

Course content (brief description by topics or modules)
Module 1. Basics of the Ecosystem Services Concept
1. Introduction to the Concept
2. Classification, Research and Analysis
3. Assessment and Valuation
Module 2. Spatial Aspects of ES and GIS
4. Mapping of ecosystems
5. Spatial Analysis of ES
6. Mapping of ecosystem services
7. Applied Aspects of ES Mapping
Module 3. GIS Applications for ES Modeling, Mapping and Assessment
8. GIS-Based Tools for ES Assessment and Mapping
9. Specialized GIS Applications for ES Assessment and Mapping
10. Online-Based Applications for ES Assessment and Mapping

Teaching and assessment methods
In-person, online or mixed.
Exam in the form of solving a practical problem.

Competencies acquired as a result of training (3–5 points)
Knowledge of the main aspects of the ecosystem services concept, its methodological foundations and practical application.
Skills for analysis and assessment of individual ecosystem services and sets of services.

Skills for applying GIS-based tools for mapping, assessment and modeling of ecosystems, their state and the services they provide.

Literature:

Bagstad, K., Semmens, D., Waage, S. and Winthrop, R. 2013. A comparative assessment of decision-support tools for ecosystem services quantification and valuation. Ecosystem Services, 5, 27–39.

Bastian, O. and Steinhardt U. (eds) 2002. Development and perspectives of landscape ecology. Springer.

Burkhard, B., and Maes, J. (Eds) 2017. Mapping ecosystem services. Pensoft.

Burkhard, B., Kroll, F., Müller, F., Windhorst, W., 2009. Landscapes Capacities to Provide Ecosystem Services – a Concept for Land-Cover Based Assessments. Landscape Online 15, 1-22.

Burkhard, B., Kroll, F., Nedkov, S. & F. Müller (2012): Mapping supply, demand and budgets of ecosystem services. Ecological Indicators 21: 17-29.

Crossman ND, Burkhard B, Nedkov S, Willemen L, Petz K, Palomo I, Drakou EG, Martín-Lopez B, McPhearson T, Boyanova K, Alkemade R, Egoh B, Dunbar M, Maes J (2013) A blueprint for mapping and modelling ecosystem services. Ecosystem Services 4: 4-14. https://doi.org/10.1016/j.ecoser.2013.02.001

Costanza R. D’Arge, R. de Groot, R, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, Oneill RV, Paruelo J, Raskin RG, Sutton P, Van den Belt M. 1997. The value of the world's ecosystem services and natural capital. Nature 387 (6630): 253-260.

De Groot RS (1992) Functions of nature: Evaluation of nature in environmental planning, management and decision making. Wolters-Noordhoff, Amsterdam. 315 pp. ISBN 90-01-35594-3

Haines-Young, R. H., Potschin, M. P. (2010). The links between biodiversity, ecosystem services and human well-being. In: Raffaelli, D. and C. Frid (Eds.): Ecosystem Ecology: a new synthesis. BES Ecological Reviews Series, CUP, Cambridge, 110-139.

Maes, J., Teller, A., Erhard, M. et al. 2013. Mapping and Assessment of Ecosystems and their Services. An analytical framework for ecosystem assessments under action 5 of the EU biodiversity strategy to 2020. 1st MAES report. Publications office of the European Union, Luxembourg.

Von Haaren, H. Lovett, A. Albert, A. (eds) 2019. Landscape Planning and Ecosystem Services. Springer.

Zulian, G., Polce, C. and Maes, J. 2014. ESTIMAP: a GIS-based model to map ecosystem services in the European Union. Annali di Bottanica, 4, 1-7.

Additional information (optional) (e.g., special requirements, laboratory equipment, prior knowledge)

Basic knowledge of landscape ecology, GIS and English for the use of specialized scientific literature is recommended.

Provision of a personal laptop.