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| **Title and code** of the subject: **Environmental impact assessment and environmental modeling, MTMKG7009A** | **ECTS Credit Points: 4** |
| **Type** of the subject: compulsory |
| **Ratio of theory and practice:** (credit%) **50/50** |
| **Type and number of classes per semester**: 28 hour(s) lecture and 28 hour(s) practice per **semester** Number of teaching hours / week : 2+2 (lecture and practice) |
| **Type of exam**: **exam**  |
| **Subject in the curriculum:** semester 2 |
| Preliminary requirements:- |

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| **Summary of content - theory**:  |
| Course objectives:The aim of the subject is to have the basic concepts of environmental modeling acquainted with students, to give an inspection into the operation practice of models connected to soil-water-air-pollution. Students get acquainted with the major application possibilities regarding the environmental aspects of modeling systems. Students learn the human- and ecotoxicological risk assessment.1. Principles of modeling
2. Importance of environmental risk assessment
3. Characteristics of soil plant atmosphere system
4. Modeling of the impacts on soil and groundwater effects
5. Modeling of the impacts on surface water effects
6. Modeling of the impacts on atmosphere effects
7. Modeling of the impacts on biomass and landscape effects
8. Modeling of the impacts on the human health effects
9. Socio-economic consequence of the impacts on the environmental effects
10. Preparing of environmental impact studies
11. Practical application of pollution transmission models, processing of remediation and monitoring
12. Remediation of soil, groundwater and surface water
13. Cost-benefit analysis of remediation
14. Development of simulation and modelling software
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| **Summary of content - practice**: |
| Skills to be learnt:1. Surfer GUI
2. Surfer colour management
3. Surfer data management
4. Grid DEM
5. Data importing
6. Basic Data statistics
7. DAT data types
8. Griding methods
9. Grid report evaluation
10. Accurate interpolations
11. IDW, TIN
12. Global interpolations
13. Kriging
14. Error propagations
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| **Literature, handbooks in English**  |
| 1. Adolf, E., Teimuraz, D. (2007): Air, Water and Soil Quality Modelling for Risk and Impact Assessment. Springer Verlag. 365 p.
2. Colombo, A. G. (2012): Environmental Impact Assessment. Springer Verlag. 334 p.
3. Bastmeijer, K., Koivurova, T. (2008): Theory and Practice of Transboundary Environmental Impact Assessment. Martinus Nijhoff Publishers. 397 p.
4. Wathern, P. (2013): Environmental Impact Assessment. Theory and Practice. Routledge (Taylor and Francis Group). 352 p.
5. GoldenSoftware(2018) Surfer Manual https://www.goldensoftware.com/products/surfer
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| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**

- Possessing agricultural, food chain safety, natural sciences, environmental, nature conservation, engineering and economics general and specific knowledge of study areas.- Know in detail the design and implementation of the field of activity of the profession, its implementing methods, rules and related features- Familiar with agricultural production, environmental protection and nature conservation of natural sciences, agricultural production, environment as well the production of healthy, high-biological quality products.- They have acquired the relevant knowledge of sustainable farming, they are in the possession of the most up-to-date knowledge of cultivation technology, knowledge of research and development1. **Skills:**

-They are capable of a multidisciplinary, interdisciplinary approach to professional issues.- They are capable of identifying specific professional problems and solving them to explore and formulate a detailed conceptual and practical background.- Possess ideas from different areas that form the knowledge system of the given field of expertise for a detailed analysis of comprehensive and specific contexts.- They able to formulate a synthetic evaluation formulation and report the results of the analysis making.- They are able to define, design, organise.- Able to engage in research and development projects1. **Attitude:**
* Recognize values, responsive for new methods and tools that help more effective application.

They are strongly committed to resolving problems on a professional basis.* Their professional interest is deepened and engaged.
* They are committed to environmental protection, nature conservation and a sustainable agrarian economy.
* Frankness, initiating, empathetic.
1. **Autonomy and responsibility:**
* They have considerable autonomy with comprehensive and specialized professional issues of environmental management in the implementation, representation and explanation of professional engineering.
* They are capable of independent, environmentally-friendly management, and are capable of applying and developing modern agricultural technologies.
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| **Responsible lecturer: Prof. János Tamás** |
| **Other lecturer(s): Dr. Bernadett Gálya**  |

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| **Terms of course completion:** |
| 1. Completing assignments / exercises
2. Submitting essay
3. Giving presentation
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| **Form of examination:** |
| written exam |
| **Requirement(s) to get signature:** |
| Active participation in lectures and exercises is a successful fulfillment of the tasks defined by the lecturer. |

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| **Exam questions:** |
| 1. Primer data acquisition
2. Seconder data acquisitions
3. Vector data model
4. Topological relationships of polygon
5. Topological relationships of TIN
6. Conceptual model
7. Object types, data integration
8. Raster conversation
9. Geoprocessing with raster
10. Physical model implementation
11. Colours modelling
12. Meta data structures
13. Attributive data sources,
14. RDBM
15. Geo mathematics
16. Site selection
17. Monitoring strategy
18. Spatial decision supporting
19. Spatial estimations accurate interpolations
20. Global interpolations
21. Error propagations
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