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| Name of course: **Adaptive Tillage** | **Credit value: 3** |
| **Course** **classification**: compulsory | |
| **The proportion of the practical nature of the course, „educational character”:** 67/33 (credit%) | |
| **Type of course: 2** theoretical / 1 practical, and the **total number: 42 hours** in the given **semester.**  Further (unique) means and properties of knowledge transfer: | |
| **Exam** type (colloquium / practical grade / **other** ): colloquium  Further (unique) means of knowledge verification**:** | |
| The curricular **place of the course** (which semester): 2 | |
| Prerequisites (if any): **-** | |

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| **Course description: a brief, but informative description of the knowledge to be acquired (14 weeks). (9 for MSc graduates) weeks** |
| General aim of the course:  Students will learn the technological methods of soil tillage to establish soil conditions that ensure the safety of crop production and to mitigate the adverse effects of climate change. They will learn about degradation processes that threaten soil conditions, methods of soil condition assessment, the characteristics of conventional and adaptive conservation tillage, their effects on soil and the environment, and tillage methods to prevent environmental damage.  1. Soil characteristics determining the quality of tillage  2. Purpose, function, importance, operational elements and procedures of soil tillage  3. The concept of the tillage system and the criteria choosing it, the classical sequence of tillage  4. Early and late tillage systems for summer and autumn sown crops after preliminary events  5. Soil management system for spring-sown crops  6. Factors determining the arable land use, depth of cultivation and basic practices for each soil type.  7. Degradation processes affecting soil fertility. Physical degradation: causes of and prevention possibilities  8. Characteristics and accompanying phenomena of the traditional tillage system. New tillage trends and systems.  9. The applicability of soil protecting, reduced tillage systems in Hungary  10. The applicability, steps, advantages and limitations of a tillage system based on a heavy duty cultivator and a loosener. Applicability, steps, advantages, limitations and barriers of a disc tillage system.  11. The applicability, steps, advantages and limitations of a seeding cultivator tillage system. Applicability, steps, advantages and limitations of a strip-tillage system. Applicability, steps, advantages and limitations of direct sowing  12. Characteristics of good quality ploughing, factors determining the quality and depth of ploughing  13. Parts of the plough, ploughing methods. Finishing ploughing.  14. The need for and purpose of subsoiling. Methods of subsoiling.  General aim of the course:  Students will learn about the practical issues of soil quality improvement, conservation and the relationship between site, mechanisation and management conditions.  1. Quality assessment of soil tillage, concepts, definitions.  2. Soil testing instruments, carrying out field measurements.  3. Field studies to determine the quality of soil cultivation.  4. Instruments for measuring soil compactness.  5. Carrying out and evaluating field soil compactness measurements.  6. Steps in the preparation of soil compaction maps.  7. Factors determining the timing and depth of subsoiling.  8. Aspects of planning subsoiling.  9. Factors determining the quality of ploughing. Evaluation of soil conditions in the case of conventional tillage.  10. Aim of planting competitions, evaluation criteria, scoring.  11. No-tillage systems.  12. Assessment of soil condition in the case of no-tillage.  13. Calculation exercise to evaluate the effect of soil loosening.  14. Calculation exercise to assess the impact of soil compaction. |
| **Required and recommended reading:** |
| **Required reading:**  1. Birkás M. (2006): Környezetkímélő, alkalmazkodó talajművelés. Akaprint Nyomdaipari  Kft. Budapest. 366 pp. ISBN: 9630602598  2. Birkás M. (2010): Talajművelők zsebkönyve. Mezőgazda Kiadó. Budapest. 282. pp. ISBN  978-963-286-626-0  *3.* Birkás M. (2017): Földműveléstan és Földhasználat. Mezőgazda Lap- és Könyvkiadó, Budapest. 481 pp. ISBN: 978-963-286-728-1  **Recommended reading:**  4. Coughenour C.M., Chamala S. (2000) Conservation Tillage and Cropping Innovation.  Iowa State University Press, Ames, Iowa. 360 pp. ISBN: 978-081381947 |
| **Competencies to be acquired, related to the course:** |
| **a) Knowledge:**  - - Students will have general and specific knowledge of their field and the theoretical and practical  knowledge is organised into a system.  - They have the practical methods, tools and knowledge needed to practice their profession on a long-term basis and to a high level.  - Knowledge of the main theories and problem-solving methods in the field.  **b) Ability:**  - - Ability to perform the job according to their qualifications.  - Planning and solving their tasks using specific and complex applications, choosing the necessary methods and tools.  - developing their knowledge by applying certain methods of knowledge acquisition and self-development, and are able to use state-of-the-art information and communication tools.  - Recognise the link between personal development and service to the common good.  **c) Attitude:**  - - They are open to new findings and innovations in their field, and strive to learn, understand and apply them, as well as to continuously educate themselves.  - Decisions in new and unexpected situations are taken in consideration and full compliance with the law and ethical standards.  - Collaborate with professionals related to their profession but working in other fields.  **d) Autonomy and responsibility:**  - - Work independently, with continuous self-monitoring.  e. - Take responsibility for the work, results and failures of their own team |

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| **Course leader** (name, post, academic degree): **Dr. Adrienn Széles, Associate Professor, PhD** |
| **Other lecturer(s) involved in teaching the course, if any** (name, post, academic degree): **Árpád Illés, assistant lecturer** |