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| **Title and code** of the subject: **Water economics, MTMVG7019A** | **ECTS Credit: 3** |
| **Type** of the subject: compulsory / optional |
| **Ratio of theory and practice:** (credit%) 70/30 |
| **Type and number of classes per semester**:28 hours lecture and 14 hour(s) practice per **semester** Number of classes per week: 2+1 |
| **Type of exam**: exam  |
| **Subject in the curriculum:** semester 3 |
| Preliminary requirements:- |

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| **Summary of content - theory**:  |
| Students get a knowledge about irrigation from a micro and macro-economic point of view. Water supply directly increase yield, in addition, it also has indirect effect on profitability, which provides additional economic benefits - students are introduced to this and other aspects, as well.1. Farm management, Farm businesses and enterprises, income costs and profitability
2. Production, economic principles and concepts, financial analyses, investment analysis and decision making
3. Marketing, value adding, human resource management, risk management
4. The business plan
5. The multiple dimensions of water management (Micro-level, Regional, Interregional)
6. Handling drought and inland waters
7. The benefits and costs of irrigation
8. The theory of the production function (Physical production functions, Spil’man function, Marginal rate of substitution, Profit maximization) water-plant relationships
9. Irrigation systems and characteristics, costs
10. Decision support system
11. Irrigation economics
12. Protecting orchard from frost and freeze, hail protection net system in orchard, (Iivestment costs, annual costs)
13. Economic and environmental characteristics of bottled water production
14. Agricultural Water Management for Sustainable Rural Development
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| **Summary of content - practice**: |
| Skills to be learnt: thinking in system approach and connect different aspects 1. Importance of water in agriculture, hydrological cycle
2. Importance of irrigation
3. Agri-Environmental indicators and irrigation in EU
4. European Irrigation Association
5. Water and energy advanced management for irrigation
6. Irrigation systems
7. Micro irrigation systems
8. Economics of irrigation systems
9. Frost and freeze protection in orchard
10. Ice storm challenges in orchard
11. Precision irrigation
12. Irrigation solutions in practice (irrigation in cropland)
13. Irrigation solutions in practice (precision irrigation)
14. Presentation
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| **Literature, handbooks in English**  |
| 1. Viktor Szabó 2016. Economics of hail protection net installation in super intensive apple orchards. Agrártudományi Közlemények, vol. 68. p. 27-35.
2. S van Zyl, PG Strauss & JB Stevens 2012. Training material for extension advisors in irrigation water management Volume 2: Technical Learner Guide Part 7: Irrigation economics. Water Research Comission. ISBN 978-1-4312-0342-0. p. 155.
3. International Commission on Irrigation and Drainage (ICID) 2016. Agricultural Water Management for Sustainable Rural Development. p. 84.
4. Karina Schoengold and David Zilberman 2007. The economics of water, irrigation, and development. (In: Handbook of Agricultural Economics, Volume 3 Edited by Robert Evenson and Prabhu Pingali) DOI: 10.1016/S1574-0072(06)03058-1. p. 2939-2984.
5. Alan Pilling Kleinman 1969. The production function and the imputation of the economic value of irrigation water. Retrospective Theses and Dissertations. Paper 4122. Digital Repository @ Iowa State University. p. 133.
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| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**
* know and understand the characteristics of irrigation economics
* know and understand the different background relations related to irrigation and profit and able to realize existing relations to agri-environment.
* get an overview of the contexts of the European Union policy.
1. **Skills:**
* cooperation in agricultural, water and environmental management and administrative tasks
* able to carry out her/his professional activity within existing legislation conditions
1. **Attitude:**
* committed to environmental protection, nature conservation and sustainable agriculture.
* legislation following behaviour.
1. **Autonomy and responsibility:**
* equal partner in the professional cooperation
* has considerable self-dependence in the field of improving comprehensive and specialized professional issues, representing and explaining professional views in the field of water and environmental management.
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| **Responsible lecturer: Dr Nikolett Szőllősi, assistant professor** |
| **Other lecturer(s): -** |

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| **Terms of course completion:** |
| 1. Completing exercises
2. Giving presentation
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| **Form of examination:** |
| Colloquium |
| **Requirement(s) to get signature:** |
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| **Exam questions:** |
| 1. Make a list about the water related agri-environmental problems and explain them!
2. Describe production economic principles!
3. Describe agri-environmental aspects of different irrigation solutions!
4. Describe irrigation economics aspects of different irrigation solutions!
5. Describe cost, income and profitability relations of irrigation!
6. Describe the risks of irrigation and how to manage them!
7. Describe cost, income, profitability relations of hail protection net system in orchard!
8. Describe cost, income, profitability relations of bottled water production!
9. Describe the contents of business plan! Describe NPV relations of irrigation systems!
10. Describe the importance of decision support system!
11. Describe the importance of digital solutions in the field of irrigation from irrigation economics aspect!
12. Describe how to choose irrigation solution from an irrigation economics aspect.
13. Describe agri-environmental aspects of irrigation! How to avoid negative impacts?
14. How could you describe the market competition of center pivot and lateral move irrigation system solutions with examples?
15. How could you describe the competition of micro irrigation solution equipment with examples?
16. Describe agri-environmental and economic aspects of center pivot and lateral move irrigation system solutions!
17. Describe agri-environmental and economic aspects of micro irrigation solution equipment solutions!
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