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| **Title and code** of the subject: **Water chemistry, MTMVG7004A** | **ECTS Credit: 4** |
| **Type** of the subject: compulsory | |
| **Ratio of theory and practice:** (credit%) 70/30 | |
| **Type and number of classes per semester**: 28 hour(s) lecture and 14 hour(s) practice per **semester**  Number of classes per week: 2+1 | |
| **Type of exam**: exam | |
| **Subject in the curriculum:** semester 1 | |
| Preliminary requirements:- | |

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| **Summary of content - theory**: |
| Course objectives: In the framework of the practice students become familiar with the applied classic and modern laboratory measuring techniques. Lab rules will be discussed. Basic devices will be presented. Weight and volume measuring techniques use in lab are discussed, furthermore, basic chemical calculations will be made. They will be able to use mobile, rapid water analytical methods and the related water quality protection regulations and legal background. Students will be able to determine water quality and thus the likely impact and danger of pollutions and can make a decision needed for intervention. Students acquire specialized knowledge in the measurement of drinking, municipal, agricultural and industrial water samples and their analytical background. They receive useful knowledge about sampling methods (water) and sample pre-treatment. |
| **Summary of content - practice**: |
| Skills to be learnt: working individually and in team; basic knowledge of classic and modern analytical measurements    Exercise 1: Lab safety, basic lab equipment  Exercise 2: Chemical calculations  Exercise 3: Water sampling and analysis steps  Exercise 4: Determination of total dissolved and suspended solids in water samples  Exercise 5: Determination of the pH of different water samples  Exercise 6: Determination of the conductivity of different water samples  Exercise 7: Determination of the acidity of different water samples  Exercise 8: Determination of the chloride concentration of different water samples  Exercise 9: Determination of the hardness of different water samples  Exercise 10: Determination of the dissolved oxygen concentration of different water samples  Exercise 11: Determination of turbidity of different water samples  Exercise 12: Determination of nitrate, nitrite and ammonium content of different water samples  Exercise 13: Determination of sulphate ion concentration in different water samples  Exercise 14. Determination of phosphorus and potassium content of water samples |
| **Literature, handbooks in English** |
| 1. Patrick Brezonik, William Arnold (2011): Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Aquatic Systems Oxford University Press, 2011. pp. 808. ISBN 019981354X, 9780199813544; FC On line: GB855 .B744 2011eb 2. Frank R. Spellman (2017): The Drinking Water Handbook. 3rd Edition, CRC Press pp. 356. ISBN 9781138066472 - CAT# K33428 3. Barbara Hauser (2001): Drinking Water Chemistry: A Laboratory Manual. 1st Edition, CRC Press pp. 214. ISBN 9781566704861 - CAT# LA4129 |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * Student has proper knowledge about the basics of laboratory practice. * Knows the methods of classic and modern chemical procedures in water analysis. * Knows the specific research methods and techniques of water chemistry.  1. **Skills:**  * Student will be able to solve different practical problems of water analysis. * Student has an appropriate environment perspective thinking. * Student will be able to assist in scientific and developing projects. * Student will be able to participate actively in team work and thus join the research and development projects.  1. **Attitude:**  * Student is committed to solve problems based on his/her professional basis. * Student has deep and professional interest in the field of water chemistry. * Student is committed to environmental protection, nature conservation and sustainable agriculture via water using technologies.  1. **Autonomy and responsibility:**  * Student is able to apply and develop modern, sustainable, environmental friendly and water saving agricultural technologies, independently. |

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| **Responsible lecturer: Dr. Elza Kovács** |
| **Other lecturer(s): Péter Tamás Nagy (PhD)** |

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| **Terms of course completion:** |
| 1. Completing assignments / exercises 2. Giving presentation |
| **Form of examination:** |
| oral presentation |
| **Requirement(s) to get signature:** |
| * attendance of the lessons |

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| **Exam questions:** |
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