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| **Title and code** of the subject: **Hydrobiology** | **ECTS Credit: 3** |
| **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: Students will acquire knowledge of the hydrobiological aspects of the agriculture, water management, environmental protection and nature conservation. Students learn about the relationship among the environment and aquatic ecosystems. Students will acquire the water biological and ecological knowledge that are necessary for agricultural water management practice (water qualifications, abstraction and distribution, design, construction and maintenance of water treatment and wastewater treatment, management of natural and artificial waterbodies and wetlands, aquaculture & irrigation systems etc.).  Weeks:  1. The concept of Hydrobiology. The main forms of surface water and groundwater bodies.  2. The biologically relevant physical and chemical properties of inland waters. The material and energy cycles of waters.  3. General Limnology. The aquatic habitats and biomes.  4. Aquatic communities. General. The concept of plankton  Aquatic communities. The phytoplankton  5. Aquatic communities. The zooplankton  6. Aquatic communities. Macroinvertebrates  7. Aquatic communities. Macroinvertebrates & FFG,  8. Aquatic communities. Macrophytes.  9. Aquatic communities. The animals of nekton. Physiology & ecology of fishes.  10. The ecological relationships of aquatic life communities (C-N-P cycles).  11. The biological (ecological) water qualification.  12. The methods of biological indications. The role of the macroscopic aquatic invertebrate in the field of the ecological water qualification.  13. Water pollution and eutrophication. Protection of natural and artificial water bodies (ponds) against eutrophication.  14. The biological aspects of waste water purification (Constructed Wetlands) |
| **Summary of content - practice**: |
| 1. Freshwater ecosystems  2. Physical-Chemical characteristics of Freshwater  3. Phytoplankton 1  4. Phytoplankton 2  5. Zooplankton  6. Bacterioplankton 1  7. Bacterioplankton 2  8. Eutrophication  9. Macroinvertebrate  10. Fishes  11. Virioplankton  12. WQ General  13. General limnology  14. Freshwater Macroinvertebrates Protocol |
| **Literature, handbooks in English** |
| 1. Horne, A.J. and C.R. Goldman. (1994): Limnology. 2nd edition. McGraw-Hill Co., New York, USA. 2. Edmondson, W. T. (1959): Freshwater Biology. John Wiley & Sons, Inc. ISBN 471 23298 X 3. Welch, P. S. (1952): Limnology. McGraw-Hill Book Company, Inc. 4. Wetzel R. (2001): Limnology. Lake and River Ecosystems. 3rd Edition. Academic Press. Hardcover ISBN: 9780127447605, eBook ISBN: 9780080574394. 5. FISRWG (10/1998).Stream Corridor Restoration: Principles, Processes, and Practices. By the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the US gov't). GPO Item No. 0120-A; SuDocs No. A 57.6/2:EN3/PT.653. ISBN-0-934213-59-3. |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * The student has the high level of hydrobiological and hydroecological knowledge needed to cultivate the agricultural water management field. * The student is familiar with hydrobiological and engineering applications related to environmental technology, biotechnology and water management. * The student is familiar with the latest ecological and biological water qualification procedures * The student is familiar with the technologies and procedures for the management, design and operation of natural and artificial wetlands.  1. **Skills:**  * The student is able to manage and protect the communities of irrigation systems and wetlands * The student is able to effectively apply and further develop environmental and engineering techniques in the field of water quality and water treatment. * The student is able to independently interpret and apply standards and legislation related to water management and environmental activities.  1. **Attitude:**  * The student takes into account the principles of environmental sustainability and economic efficiency * The student is committed to environmental protection and sustainable agriculture. * Make the student's opinion on a professional basis, consistently represent them. * The student cooperates with experts from other disciplines, accepts different opinions if they are appropriately supported by the professional. * Lifelong learning  1. **Autonomy and responsibility:**  * With his practical experience, the student decides independently on the way in which biological water treatment, wetland management, water supply, engineering and environmental technology work processes are implemented. * The student makes decisions with professional responsibility, takes the consequences. * The student represents, adheres to and complies with the environmental and engineering ethics rules of his / her field |

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| **Responsible lecturer: Dr Pregun, Csaba** |

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| **Terms of course completion:** |
| 1. Completing assignments / exercises |
| **Form of examination:** |
| written and/or verbal |
| **Requirement(s) to get signature:** |
| Participation in lectures and practical exercises. Successful completion of practical tasks. |

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| **Exam questions:** |
| 1. Describe the subject of hydrobiology and its relationship with the sciences. 2. Describe the main physical characteristics of water! 3. Describe the main chemical characteristics of water! 4. Describe the biological significance of density, buoyancy, concentration and solubility. 5. An overview of standing water habitats. 6. Characterization of pleuston and nekton. 7. Zoning and characteristic vegetation of the coastal region. 8. Stream water habitats and associations 9. Describe the River Continuum Concept! 10. Describe the Flood Pulse Concept! 11. Vertical layering of lakes (by light and temperature) 12. The light conditions of the waters 13. The sediment materials according to their origin. 14. Types of biological sediments. 15. General characterization of plankton. 16. Characterization and significance of bacterioplankton. 17. The importance and ecological role of phytoplankton (algae). 18. The plankton paradox. 19. A summary of blue algae (Cyanobacteria) and whipped-algae (Euglenophyta). 20. Summary of Diatoms and Dinophyta. 21. A summary of the green algae. 22. A summary of brown algae (Phaeophyta) and red algae (Rhodophyta). 23. Description of macrophytes. 24. Macrophytes adapt to the aquatic lifestyle. 25. Characterization of animal monocytes (zooplankton I) 26. Characterization and reproduction of Rotatoria (zooplankton II) 27. Characterization of Cladocera and Copepods (Zooplankton III) 28. The general characterization of aquatic invertebrates 29. Characterization of aquatic invertebrates (mayflies). 30. Characterization of aquatic invertebrates (dragonflies). 31. Characterization of aquatic invertebrates (stoneflies) 32. The Functional Feeding Groups. 33. General characterization of the body structure of fish. Fish lifestyle and ecology. 34. The lifestyle and theology of frogs. 35. Water rating methods. 36. Eutrophication 37. Constructed wetlands |