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| **Title** of the subject: **Sustainable agricultural systems and technologies II – Animal breeding, MTMKG7012A** | **ECTS Credit Points: 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 teaching hours / week : 2+1 (lecture and practice) | |
| **Type of exam**: exam | |
| **Subject in the curriculum:** semester 2 | |
| Preliminary requirements:- | |

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| **Summary of content - theory**: |
| The general aim of the subject is to inform students about the modern animal housing systems and the extensive animal production as well. During the lectures student will study the requirements of sustainable animal production, the effect on environment and the possibilities to alter the effect of animal production on grassland, environment and climate change.   1. Aim of animal production and animal products and performance 2. Production traits, requirements to environment 3. Housing and feeding of livestock species: cattle 4. Housing and feeding of livestock species: sheep 5. Housing and feeding of livestock species: swine 6. Housing and feeding of livestock species: poultry 7. Animal nutrition, genetics, selection for breeding can contribute to a sustainable animal production 8. The role of gene reserve stocks on sustainable animal production, environmental protection, and ecological production 9. Environmental issues of animal nutrition. Possibilities to decrease environmental load of nitrogen, phosphorous, potassium, methane. 10. The effect of domestic animals on environment. Technologies to decrease ecological footprint. 11. Feed processing, compound feed production and environment. 12. Animal grazing 13. Animal grazing technologies. Grazing on vulnerable land. 14. Ecological animal production with different livestock and poultry species |
| **Summary of content - practice**: |
| Skills to be learnt: Students will have knowledge and experience on mitigation strategies and can evaluate the significance of environmental effect of livestock.     1. Sustainable animal production in related to methane emission 2. Animal performance and environmental consequences 3. Cattle contributes to climate change – different viewpoints 4. Possibilities and tools to decrease nitrogen output from livestock farms 5. Possibilities and tools to decrease nitrogen output from livestock farms 6. Possibilities and tools to decrease phosphorous output from livestock farms 7. Possibilities and tools to decrease phosphorous output from livestock farms 8. Enzymes in feed 9. How can precision livestock farming decrease the environmental impact of animal production? 10. How can precision livestock farming decrease the environmental impact of animal production? 11. Effect of livestock on biodiversity 12. Effect of livestock grazing on biodiversity 13. Effect of livestock grazing on vegetation of grassland 14. Effect of livestock grazing on soil properties of grassland |
| **Literature, handbooks in English** |
| 1. Henning Steinfeld, Pierre Gerber, Tom Wassenaar, Vincent Castel, Mauricio Rosales, Cees de Haan (2006): Livestock's Long Shadow: Environmental Issues and Options. Food and Agriculture Organization of the United Nations. 1-390. 2. Henning Steinfeld et al., eds. (2010): Livestock in a changing landscape. Volume 1. Island Press. 1-396. 3. Pierre Gerber et al., eds. (2010): Livestock in a changing landscape. Volume 2. Island Press. 1-189. |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**   Has the knowledge on general and specific issues of animal production.  Knows the life science basics of agricultural production systems, relationship between environment and nature, and the basics of the production healthy, high biological value agricultural products.   1. **Skills:**   Able to make an interdiscipline approach for professional problems.   1. **Attitude:**   Committed to making professional solutions for emerging problems.   1. **Autonomy and responsibility:**   Able to make independent, environment friendly farming and use state of the art technologies. |

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| **Responsible lecturer: Levente Czegledi PhD, Associate Professor** |

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| **Terms of course completion:** |
| 1. Completing exercises 2. Giving presentation |
| **Form of examination:** |
| written |
| **Requirement(s) to get signature:** |
| Attendance at lectures is recommended, but not compulsory.  Participation at practice is compulsory. Students must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at practice classes will be recorded by the practice leader. |

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| **Exam questions:** |
| 1. Aim of animal production and animal products and performance 2. Production traits, requirements to environment 3. Housing and feeding of livestock species: cattle 4. Housing and feeding of livestock species: sheep 5. Housing and feeding of livestock species: swine 6. Housing and feeding of livestock species: poultry 7. Animal nutrition, genetics, selection for breeding can contribute to a sustainable animal production 8. The role of gene reserve stocks on sustainable animal production, environmental protection, and ecological production 9. Environmental issues of animal nutrition. Possibilities to decrease environmental load of nitrogen, phosphorous, potassium, methane. 10. The effect of domestic animals on environment. Technologies to decrease ecological footprint. 11. Feed processing, compound feed production and environment. 12. Animal grazing 13. Animal grazing technologies. Grazing on vulnerable land. 14. Ecological animal production with different livestock and poultry species 15. Possibilities and tools to decrease N and P output from livestock farms 16. Animal performance – significance of environmental issues 17. Livestock and climate change |