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| Name of course: **Genetics of cultivated plant** | **Credit value:**  |
| **Course** **classification**: compulsory |
| **The proportion of the practical nature of the course, „educational character”: 50/50 (%)** |
| **Type of course: 1** theoretical / 1 practical, and the **total number: 3 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): I. semester |
| Prerequisites (if any): **-**  |

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| **Course description: a brief, but informative description of the knowledge to be acquired (14 weeks).** |
| Course objectives:1. History of plant breeding2. Basic of molecular genetics (definitions, basic of gene expression).3. Basic of plant biotechnology, plant reproductive biology3. Cytology of domesticated plants, the (poli)ploidy and its importance in the plant domestication4. In vitro haploid techniques, and their significance in plant breeding5. In vitro micropropagation techniques of cultivated plants, their importance of plant breeding6. Traditional plant breeding techniques, seed biology7. Mendel’s genetics, and its importance in modern plant breeding.8. Inheritance of quantitative traits 9. Polimerase chain reaction, gel electrophoresis and its use in marker assisted plant breeding10. Gene expression assays, RT-PCR, (RNA isolation and RNA integrity, one and two steps real time PCR)11. Basic of bioinformatics and new generation sequencing (databases, primer designing, some free software usage).12. GM plants13. New generation gene editing techniques14. Summary, test. |
| **Summary of content - practice**: The knowledge to be acquired is concise, as well as a 14 week breakdown of practice. |
| Description of goal:Training of plant genetic and breeding, who are in possession of an appropriate economic approach, they know the cultivation of plants, knows the variety and its importance. Skills to be learnt:1. Plant biotechnology laboratory presentation,
2. Plant DNA/RNA isolation, the chemistry of ribonuleic acids.
3. IN vitro plant propagation: shoot induction,
4. In vitro plant propagation: in vitro seed showing
5. In vitro androgenesis on peper
6. In vitro somatic embryogenesis
7. Field practice (*Capsicum* crossing)
8. Bioassay of plant virus resistance, and their inheritance
9. Gel elektrophoresis- isolated DNA quality assays.
10. Gel elektrophoresis- isolated RNA quality assays.
11. PCR- RAPD, ISSR
12. RT-PCR
13. Molecular genetic data interpretation
14. Summary, test.
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| **Required and recommended reading:** |
| **Required reading:**Acquaah, G. (2009). *Principles of plant genetics and breeding*. John Wiley & Sons., 584, <http://eprints.stiperdharmawacana.ac.id/105/1/%5BGeorge_Acquaah%5D_Principles_of_Plant_Genetics_and_%28BookFi%29.pdf>**Recommended reading:**Al-Khayri, J. M., Jain, S. M., & Johnson, D. V. (Eds.). (2015). *Advances in plant breeding strategies: breeding, biotechnology and molecular tools*. Springer International Publishing, ISBN: 978-3-319-22521-0. |
| **Competencies to be acquired, related to the course:** |
| 1. **Knowledge:**
* Knows, integrates, synthesizes and plant genetics, biotechnology development also places the disciplinary knowledge of plant breeding in systems
* Knows the mechanism of action of the genes that can be used, work and food hygiene and as well as occupational safety regulations.
* Knows plant breeding strategies.
1. **Skills:**
* They will be able of integrated plant variety management against that pose a threat to plants planning and implementation.
* They will be able to perform practical plant cultivation, administrative and other plant breeding management tasks.
1. **Attitude:**
* Has the necessary knowledge to perform engineering and managerial duties.
* Susceptible and suitable for cooperation.
* Their work is characterized by high standard.
* They are able to stand up for their views, but are open to others’ opinions as well.
1. **Autonomy and responsibility:**
* They can recognize the risks and boundaries of their decisions.
* They have an independent sense of professional responsibility.
* They are fully aware that in a foreign environment they always represent their country, thus influencing the picture of it by their behaviour.
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| **Course leader** (name, post, academic degree): **Dr. Erika Kurucz, assistant professor, PhD** |
| **Other lecturer(s) involved in teaching the course, if any** (name, post, academic degree): **Dr. Antal Gabriella, assistant professor, PhD.** |