**EDUCATIONAL PLAN**

**Subjects of DSPS**

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| **Common optional subjects of the doctoral school** |
|  | **Subject (tutor)** | **semester** | **credit** |
| **1.** | Design and evaluation of experiments (Dr. MatuzJános/Dr. Berzsenyi Zoltán) | **I.** | **10** |
| **2.** | Publication and presentation of experimental results (Dr. Sági László) | **III.** | **10** |

**Subjects of DSPS Genetics and biotechnology program**

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| **Genetics and biotechnology** | **semester** | **kredit** |
| **Compulsory subjects** |  |  |
| **1.** | Plant molecular genetics and molecular breeding (Dr. KissErzsébet) | **I.** | 10 |
| **2.** | Plant cell genetics and in vitro breeding (Dr. Gyulai Gábor) | **II.** | 10 |
| **3.** | Plant gene technology and transgenic breeding (Dr. SágiLászló) | **II.** | 10 |
| **4.** | Classical and detailed plant breeding (Dr. Hajós Lászlóné) | **III.** | 10 |
| **Optional subjects** |  |  |
| **5.** | Biochemical analysis (Dr. Fülöp László) | **I.** | 8 |
| **6.** | Cytogenetics (Mázikné Dr. Tőkei Katalin) | **II.** | 8 |
| **7.** | Quantitative genetics (Dr. Csizmadia László) | **II.** | 8 |
| **8.** | Population genetics (Dr. Matuz János) | **II.** | 8 |
| **9.** | Biotic stress resistance (Dr. Barna Balázs) | **III.** | 8 |
| **10.** | Abiotic stress resistance (Dr. Galiba Gábor) | **III.** | 8 |
| **11.** | Development genetics (Dr. Bánfalvi Zsófia) | **III.** | 8 |
| **12.** | Virus genetics and diagnostics (Dr. Várallyay Éva) | **III.** | 8 |
| **13.** | Biotechniques os sexual reproduction (Dr. Barnabás Beáta) | **III.** | 8 |
| **14.** | Biotechnology of cereals (Dr. Pauk János) | **IV.** | 8 |
| **15.** | Plant cell and tissue culture (Dr. Preininger Éva) | **I.** | 8 |

**Plant genetics and biotechnology program PhD complex exam topics**

1. Plant molecular biology and genetics
2. Plant cell biotechnology and tissue culture
3. Plant molecular transformation and transgenic plants
4. Biotic and abiotic stress genetics and breeding
5. Genetics and breeding of cereals
6. Genetics and breeding of industrial plants
7. Genetics and breeding of fodder plants
8. Genetics and breeding of vegetable plants
9. Genetics and breeding of woody plants

**Subjects of field crop production and tillage program of DSPS**

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| **Field crop production and tillage** |
| **Compulsory subjects** |
|  | **Subject (tutor)** | **credit** |
| **1.** | Field crop production (Dr. Jolánkai Márton) | 10 |
| **2.** | Agrometeorology (Dr. Waltner István) | 10 |
| **3.** | Crop production (Dr. Jolánkai Márton) | 10 |
| **4.** | Soil fertility and water management (Dr. Percze Attila – Dr. Simon Barbara) | 10 |
| **5.** | Sustainability, oecology, soil use (Dr. Birkás Márta) | 10 |
| **6.** | Practical plant breeding (Dr. Hajós Lászlóné – Dr. Polgári Dávid) | 10 |
| **7.** | Vegetable production (Dr. Helyes Lajos) | 10 |
| **8.** | Irrigation of field and horticultural crops(Dr. Helyes Lajos) | 10 |
| **9.** | Soil protecting turf and sport turf (Dr. Szemán László – Dr. Tarnawa Ákos) | 10 |
| **Választható tárgyak** |
| **10.** | Genetic basis of field crop production (Dr. Veres Anikó) | 8 |
| **11.** | Horticultural technologies (Dr. Helyes Lajos, Dr. Pék Zoltán) | 8 |
| **12.** | Plant growth models (Dr. Berzsenyi Zoltán) | 8 |
| **13.** | Production of wheat and corn (Dr. Kassai Katalin) | 8 |
| **14.** | Production of other cereal crops (Dr. Tarnawa Ákos) | 8 |
| **15.** | Alternative plant production (Dr. Kassai Mária Katalin – Dr. Tarnawa Ákos) | 8 |
| **16.** | Novelties in Horticulture (Dr. Pék Zoltán) | 8 |
| **17.** | Production of leguminose fiber fodder plants(Dr. Kassai Mária Katalin) | 8 |
| **18.** | Energy saving tillage (Dr. Birkás Márta) | 8 |
| **19.** | Soil use and plant production in unfavourable growing areas (Dr. Gyuricza Csaba) | 8 |

**Field crop production and tillage program PhD complex exam topics**

1. Precision and integrated methods in field crop production
2. Sustainable tillage and soil use
3. Application of agrotechnical methods to limit climate damage
4. The effect of abiotic and biotic factors on the production of field crops
5. Lawn, sport and environment protectant turf grass
6. The effect of abiotic and biotic factors on the production of horticultural crops
7. Evaluation of the ecological and technological factors affecting the forcing of vegetables.
8. Evaluation of the situation of irrigation and the necessity of its development

**Subjects of the Plant protection and disease physiology program of DSPS**

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| **Compulsory subjects of the plant protection and disease physiology program** |
|  | **Subject (tutor)** | **credit** |
| **1** | Advanced IPM (Dr. Kiss József) | 10 |
| **2** | Biological Pest Control (Dr. Turóczi György) | 10 |
| **3** | Plant pests (Dr. Tóth Ferenc) | 10 |
| **4** | Crop pathogens (Dr. Bán Rita) | 10 |
| **5** | Biotic Stress (Dr. Barna Balázs) | 10 |
| **6** | Resistance breeding (Dr. Mesterházy Ákos) | 10 |
| **7** | General and applied mycology (Dr. Kőrösi Katalin) | 10 |
| **8** | Weeds and invasive plant species (Dr. Dorner Zita) | 10 |
| **9** | Advanced Entomology (Dr. Kontschán Jenő) | 10 |
| **10** | Invasive arthropod pests (Dr. Szénási Ágnes) | 10 |
| **11** | Evaluation of IPM methods in field crops (Dr. Pálinkás Zoltán) | 10 |
| **12** | Pheromones and chemical ecology of insects (Dr. Szőcs Gábor) | 10 |

**Plant protection and disease physiology program PhD complex exam topics**

1. The description and plant protection association of animal associates and trophic relationships of field and horticultural crops
2. Diseases and phytopathological conditions of field and horticultural crops
3. Botanical and weed conditions and the correlations of weed control in filed and horticultural crops
4. Analysis of the principles and the tool systems of integrated plant protection
5. Theoretical correlation of the integrated plant protection of field and horticultural crops
6. The plant protection related description of agricultural landscape and its elements and its correlative role in ecosystem services
7. Biological and ecological plant protection
8. Analysis of innovative plant protection methods

***The compulsory subjects of the doctoral school teach students the methodology of research as a profession, the special subjects related to the programs give an up to date knowledge in the area.***

# General conditions

# The condition for obtaining the absolutory certificate is the acquisition of 240 credits during the entire duration of the training (8 semesters), of which at least 120 credits must be completed before the complex exam (4 semesters), which must be completed as follows:

# The number of credits that can be obtained during the first four semesters (2 years) of the program is broken down below:

# Study credits: 80

# Tuition credits: 0-16

# Research credits: 80

# Publication credits: from the 1st semester: conference abstract 1 credit, conference proceeding 4 credits, peer-reviewed article 6 credits, peer-reviewed article ( with IF) 10 credits.

# Credit values that can be obtained during the second four semesters of the course:

# Educational credits: 0-16

# Research credits: 80

# Publication credits: minimum 26 credits: conference abstract 1 credit, conference proceeding 4 credits, peer-reviewed article 6 credits, peer-reviewed article ( with IF) 10 credits.

# *Suggested training plan:*

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|  | *semester / credit value* |
| Semester | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Educational credits *(compulsory subjects, optional subjects)* | 20 | 20 | 20 | 20 | - | - | - | - |
| Research credits | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Tuition credits | 0-4 | 0-4 | 0-4 | 0-4 | 0-4 | 0-4 | 0-4 | 0-4 |
| Publication credits | 0-21 | 0-21 | 0-21 | 0-21 | 0-21 | 0-21 | 0-21 | 0-21 |
| Credit values in total | 40-65 | 40-65 | 40-65 | 40-65 | 20-45 | 20-45 | 20-45 | 20-45 |

Study credits are calculated on the basis of the credit value of the subjects announced in the training plan of the Doctoral School of Plant Sciences, and on the credit values judged on the basis of the credit certificate of subjects successfully taken at other doctoral schools.