

# University of Zagreb Faculty of Agriculture

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Harmonization and Innovation in PhD Study Programs for Plant Health in Sustainable Agriculture –HarISA is a Erasmus+ project funded with the support of the European Union. Project Number: 598444-EPP-1-2018-1-HR-EPPKA2-CBHE-JP (2018-2472 / 001-001)



# *University of Zagreb*





# *University of Zagreb (1669 – 2019)*

## **Constituent Units of UNIZG:**

- 29 Faculties
- 3 Art Academies
- University Centre for Croatian Studies



## *Organizational Units*

- Centre for Advanced Academic Studies in **Dubrovnik**
- Centre for Field Studies and Continuing Education in **Motovun**
- International Research Centre for Archeology Brijuni - **Medulin**

### Legal entities

- University Computing centre
- University Student Centres (Zagreb, Varaždin, Sisak)



## *Facts*

- about 70.000 enrolled regular students at the University of Zagreb  
→ 50% of all students in the Republic of Croatia
- about 7.000 teaching and administrative full-time staff (34% administrative staff)





## University of Zagreb

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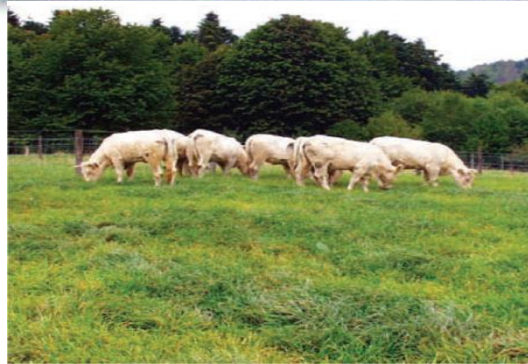
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# *Faculty of Agriculture University of Zagreb*







# *Faculty of Agriculture*

- the oldest and leading higher education agricultural institution in the Republic of Croatia
- founded 1919 as Faculty of Agriculture and Forestry in Zagreb
- Faculty of Agriculture (FAZ) becomes independent in 1959







# *Faculty of Agriculture*

## 436 employees:

- 241 teaching and scientific staff
- 195 administrative and technical staff

## 2.530 students:

- 1.328 undergraduate
- 962 graduate
- 240 postgraduate





# Organizational Units

## 28 Departments:

- Agricultural Botany
- Agricultural Economics and Rural Development
- Agricultural Engineering
- Animal Nutrition
- Animal Science
- Animal Science and Technology
- Agricultural Technology, Storage and Transport
- Agricultural Zoology
- Chemistry
- Dairy Science
- Management and Rural Entrepreneurship
- Field Crops, Forage and Grassland
- Department of Fisheries, Apiculture and Special Zoology
- General Agronomy
- Weed science
- Information Science and Mathematics
- Marketing in Agriculture
- Microbiology
- Ornamental Plants, Landscape Architecture and Garden Art
- Plant Pathology
- Plant Nutrition
- Plant Breeding, Genetics and Biometrics
- Pomology
- Seed Science and Technology
- Soil Science
- Soil Amelioration
- Vegetable Crops
- Viticulture and Enology





## *Experimental stations*

- Faculty of Agriculture owns 6 experimental stations → used for scientific, technical activities, research and practical work for teachers and students

1. **Maksimir** - 25 Svetošimunska St., Zagreb (in the FAZ neighbourhood)
2. **Jazbina** (142), Zagreb (a couple of kilometres from the FAZ campus)
3. **Center for Grasses, Sljeme** at Mountain Medvednica
4. **Historical Gardens and Landscape Development Center**, Dubrovnik
5. **State-owned hunting grounds III/29 Josip ban Jelačić, Prolom** (some ten kilometres from the City of Glin)
6. **Šašinovečki Lug**, Šašinovec near Sesvete (located some 15 km from the FAZ campus)





## Maksimir

- 21,5 ha / 53,1 acres
- intended for teaching and scientific research in crop husbandry, horticulture, industrial garden and ornamental crops







## Jazbina

- 25 ha / 61.78 acres
- used for teaching and scientific research in the field of viticulture and pomiculture
- modern scientific and teaching facility with exemplary vineyards and fruit species of this area
- equipped experimental cellar for teaching and research in enology







## Center for Grasses

- 65.5 ha / 161.9 acres
- located on the northern slope of Medvednica mountain at altitude of 700 m
- teaching and experimental research in cattle and sheep breeding and mountain agriculture
- pastures and grasslands, equipped laboratory and a classroom







## Šašinovečki Lug

- 76.8 ha / 190 acres
- located 20 km East of Zagreb
- teaching and experimental research in field crops
- 





## Hunting area Prolom

- 7,709.00 ha / 19,041 acres
- located 100 km from Zagreb
- equipped with accommodation facilities, science research unit and laboratory and all the necessary agricultural machinery for management of hunting ground.







## Scientific Research

- 270 researchers are involved in scientific and research work

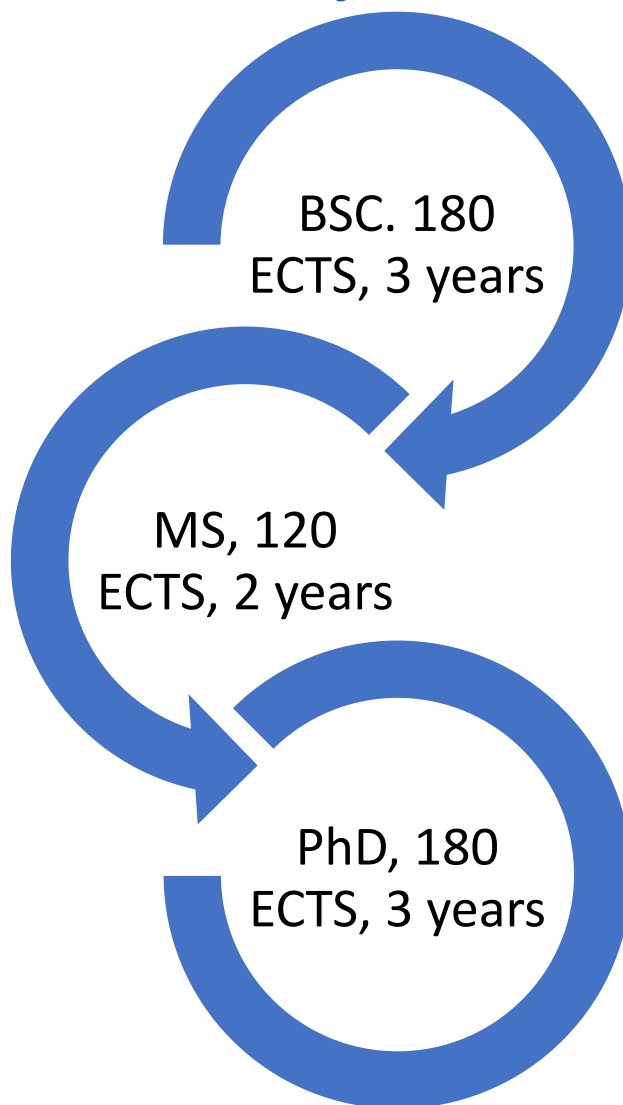




- over 40 international scientific projects
- many applied research projects and development projects in technology
- a great number of applied projects → industry, farmers, state and local administrations







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ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ





## **9 UNDERGRADUATE STUDIES**

**(6 semesters, 180 ECTS)**

- **Agricultural Economics**
- **Agricultural Engineering**
- **Agroecology**
- **Animal Sciences**
- **Horticulture**
- **Landscape Architecture**
- **Organic Agriculture**
- **Plant Protection**
- **Plant Sciences**





## **14 GRADUATE STUDIES** (4 semesters, 120 ECTS)

**Agribusiness and Rural Development**

**Agroecology**

**Plant Sciences**

**Organic Agriculture with Agrotourism**

**Plant medicine**

**Animal Genetics and Breeding**

**Horticulture**

**Animal Nutrition and Feed Science**

**Landscape Architecture**

**Agricultural Engineering**

**Production and Processing of Meat**

**Production and Processing of Milk**

**Fisheries and Game Management**

**Environment, agriculture and resource management (INTER-EnAgro)- in English**

**Sustainable Agriculture, Food Production and Food Technology in the Danube Region (DanubeAgriFood-Master – DAFM)- Joint Master study program**



## **POSTGRADUATE STUDIES**

### **Doctoral studies (6 semesters, 180 ECTS)**

- Agricultural Sciences

### **Specialist studies**

- Fisheries (2 semesters, 60 ECTS)
- Animal Sciences (2 semesters, 60 ECTS)
- Executive MBA in Agribusiness and Commerce (4 semesters, 120 ECTS)



# Postgraduate doctoral study programe „Agricultural sciences”



# Erasmus+

Co-funded by the European Union

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## 1. General information

<b>1.1 Name of the study programme</b>	Postgraduate doctoral study programme in AGRICULTURAL SCIENCES
<b>1.2 Study programme coordinator</b>	University of Zagreb Faculty of Agriculture
<b>1.3 Programme implementer(s)</b>	University of Zagreb Faculty of Agriculture
<b>1.4 Partner institutions(s)</b>	Faculty of Forestry, Faculty of Food Technology and Biotechnology, Faculty of Veterinary Medicine, Faculty of Science Zagreb, Ruđer Bošković Institute
<b>1.5 Scientific or artistic field</b>	Biotechnical sciences
<b>1.6 Scientific or artistic area</b>	Agriculture
<b>1.7 Scientific or artistic branch (if the doctoral study is conducted in a branch)</b>	The postgraduate doctoral study programme is conducted in the field of agriculture
<b>1.8 Number of required courses/modules</b>	2
<b>1.9 Number of elective courses/modules in the study programme</b>	88
<b>1.10 The minimum number of doctoral students enrolled set by the programme</b> five (5)	<b>1.11 The maximum number of doctoral students enrolled set by the programme</b> fifty (50)



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# TEMPUS project (2003)

The main partners:

University of Hohenheim (Germany),  
University of Agriculture in Vienna (BOKU).

Basic aim was to harmonize the University  
programs with the targets of the Bologna  
Declaration



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Semester	Activity	ECTS number
<b>Semester I</b>	Obligatory course “Scientific and research system”	6
	Obligatory course within the dissertation topic	6
	3 elective courses related to the dissertation topic (can be enrolled at other doctoral) programmes	18
<b>Semester II</b>	Research work	30
<b>Semester III</b>	Research work	30
<b>Semester IV</b>	Research work	30
<b>Semester V</b>	Research work	30
<b>Semester VI</b>	Dissertation completion	30



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## LEARNING OUTCOMES OF THE STUDY PROGRAMME (i)

- ❑ Identify research problem in the field of agriculture and rural development and to evaluate basic types of research in agriculture and related fields.
- ❑ Categorize basic concepts of scientific research: set-up explicable hypothesis, determine the measurable research goals and design original research in the field of agriculture, primary processing and food production, environmental protection and rural development.
- ❑ Select and use appropriate scientific methods in the research process (analytical, synthetic, quantitative, statistical and socio-economic analysis, etc.).

## LEARNING OUTCOMES OF THE STUDY PROGRAMME (ii)

- ☐ Critically analyse and evaluate the results of its own scientific research, interpret and argue against larger and more complex social groups and present the latest technical, technological and socio-economic knowledge in the field of agriculture and related activities.
- ☐ Publish research results in high-ranking journals with the aim of disseminating new knowledge and to apply new knowledge and skills in production and economic practices in the field of agriculture and related activities.
- ☐ Actively participate in the preparation of studies, project proposals, strategic and operational documents in the field of agriculture and rural development.



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## LEARNING OUTCOMES OF THE STUDY PROGRAMME (iii)

- ☐ Guide and/or monitor the implementation of projects and business activities in more complex production and socio-economic systems in the field of agriculture, food processing and food production, environmental protection and rural development with the highest level of social responsibility.
- ☐ Create new proposals (individually and/or in teams) to solve the problem of agricultural production and rural development in changing and unknown natural, productive, economic and socio-political conditions and circumstances.
- ☐ Apply the latest scientific knowledge, cognitions and technologies to improve production and organizational processes in the field of agriculture, food processing and food production, environmental protection and rural development (through the field, laboratory and social research etc.).



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## LEARNING OUTCOMES OF THE STUDY PROGRAMME (iv)

- ☐ Individually suggest and take part in the adoption of measures for agricultural, environmental and rural development policies.
- ☐ Develop research and learning skills necessary for lifelong learning and continuous improvement and development of the acquired knowledge (formal, informal and informal).
- ☐ Follow, synthesize and evaluate national and international scientific and professional literature and to evaluate the scientific and professional work in the field of agriculture.



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# Compliance with the European Qualification Framework

Level	Knowledge	Skills	Responsibility and autonomy
8.2.	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research



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# Courses of general importance for the study program

## List of the courses:

- 1. Scientific and Research System – Obligatory**
- 2. All modules related to the doctoral thesis – total 88 modules**



# Course: Scientific and Research System

Course:

## Status of the courses: Obligatory

Year of the study programme: First

Type of instruction (number of hours L+S+E): 20 L + 10 S

Credits (ECTS): 6

# AIMS

The aim of this module is to introduce students to the basic tenets of scientific research and the acquisition of basic knowledge of the rules of planning, organizing and presenting scientific research.

The practical aim of the module is to prepare postgraduate students for the work on dissertation.

# Course: Scientific and Research System Learning outcomes (I)

- ☐ Describe and explain the terms – science, scientific research and work; critically judge the unethical conduct in science and scientific community.
- ☐ Collect the scientific literature by searching databases.
- ☐ Distinguish and classify scientific publications; carry out the procedure of publication in the scientific journals.



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# Course: Scientific and Research System Learning outcomes (II)

- ☐ Devise, organize and prepare a presentation of scientific research and present it.
- ☐ To discuss, create and set up hypotheses in accordance with the purposes and self-assess them and recognize the need and role of statistical analysis in the scientific work.
- ☐ Formulate and design application and the defense of the doctoral thesis



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## LIST OF THE COURSES THAT FOCUS ON VARIOUS DISCIPLINES IN PLANT HEALTH (total 8)

### PLANT PATHOLOGY

Plant bacteriology

Plant mycology

Plant Virology

### ENTOMOLOGY & ZOOLOGY

Research Methods in  
Agricultural  
Entomology

Agricultural Zoology

### WEED SCIENCE

Advanced Weed  
Management

### PHYTOPHARMACY

Methods for Ecological Quality  
Evaluation in the Integrated Plant  
Protection System

Phytopharmacy with  
Ecotoxicology



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## Plant pathology courses- Learning outcomes (I)

- ☐ Integrate theoretical knowledge and practical skills in the selection and application of diagnostic tools to identify plant pathogenic bacteria, funghi and plant viruses and recognize the symptoms of viral diseases
- ☐ Analyze and evaluate the collected facts about the diseased plant with the aim of describing the basic biology of fungal, bacterial and viral pathogens
- ☐ Analyze and evaluate information, to discuss the importance of funghi, phyto bacteria and plant viruses in natural and cultivated ecosystems
- ☐ Create/design and conduct research in the area of plant bacteriology in order to confirm the presence of bacterial species or even in finding new species, diagnose mycosis and advice for further tests necessary for full identification of an isolated fungus, conduct further tests necessary for full identification of a new non identified fungus



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## Plant pathology courses- Learning outcomes (II):

- ☐ Plant laboratory investigation for the diagnosis of mycotic disease and interpret results of culture on fungal isolation media
- ☐ Describe the parasitic and mutualistic interactions between fungi and plants as a demonstration of a broad and coherent knowledge of the subject
- ☐ Analyze and evaluate information in order to discuss the role of pathogenes in natural and managed ecosystems
- ☐ Create and conduct antifungal susceptibility testing
- ☐ Recognize the importance and role of plant virology in agricultural plant production Explain the characteristics of plant viruses an (morphology, taxonomy, ecology, chorlogy and pathogenesis)
- ☐ Use of Web databases and other Internet resources about plant viruses



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## Entomology & Zoology courses- Learning outcomes (I):

- ☐ Identify and appoint animal pests organisms in crop production
- ☐ Distinguish and describe types of damage caused by plant pests in crop production
- ☐ Select the appropriate methodes of sampling of plant material and soil so as identification methodes in order to determine the level of pest population
- ☐ Calculate and predict the attack intensity of harmful organisms
- ☐ Analyze and identify the reasons for the appearance of certain pests
- ☐ To develop recommendations for the suppression or protection plantations of harmful nematodes, mites, slug and snails, rodents and birds in specific conditions and different types of agricultural production



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## Entomology & Zoology courses- Learning outcomes (I):

- ☐ Research planning and selection of the research methods in concrete conditions
- ☐ Analysis and assessment of the possibility to use particular method in the implementation of selected entomological researches
- ☐ Elaboration, evaluation and selection of the methods for insect breeding in laboratory conditions
- ☐ Assessment of the impact of the selected method on biological diversity and composition of the fauna in ecosystems
- ☐ Selection of the research method within the doctoral dissertation topic, explanation and valuation of justifiability of that selection



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## Weed science courses- Learning outcomes (I):

- ☐ To define the fundamental terms of weed science and to explain their importance and interaction
- ☐ To distinct and to argument the advantages and disadvantages of chemical weed control methods
- ☐ To analyse and evaluate the global development and trends in weed control
- ☐ To lead or to participate in creating strategies, studies or documents in the field of sustainabel use of herbicides



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## Phytopharmacy courses- Learning outcomes (I):

- ☐ To analyze and understanding the historic development of the pesticides and to critically elaborate each group of pesticides within the context of the time when it was developed and applied
- ☐ Critically evaluate toxicological and ecotoxical properties of PPs
- ☐ Describe and elaborate potential impacts and consequences of application of different group of PPs on agro-ecosystem and effectively react if the unprofessional application of PPs occurs and cause negative implications on agro-ecosystem



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## Phytopharmacy courses- Learning outcomes (I):

- ☐ Chose and apply adequate methods for the evaluation of the PPs
- ☐ Select and apply the most appropriate method and PPs in order to control various pests
- ☐ Plan and carry out investigations with PPs, analyze, discuss and present obtained results
- ☐ Independently create scientific research from the field phytopharmacy
- ☐ Identify the factors that causes of biological balance
- ☐ Design a sustainable model in landscape arhitecture with ecological infrastructure



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## SWOT OF THE PhD STUDY PROGRAMME

### Strengths

- Large number of students enrolled
- Very diverse selection of courses
- Excellent choice of supervisors and other external experts
- High level of satisfaction and harmony between students and supervisors

### Weaknesses

- Poor national financing of the scientific research
- Teachers are not motivated to apply for EU and domestic projects
- Students for the real sector are not ready (or not able due to their regular engagements) to carry out all the activities related to completing PhD studies (conferences, mobility etc.)

### Opportunities

- Excellent collaboration with the national agricultural and food processing industry
- International co-operation with other HEIs
- Good skills of teachers to apply for funds
- Available EU funds for scientific projects
- Possibilities to attract PhD students from abroad

### Threats

- Persons holding PhD degree are not recognized by job market (overeducated??)
- Low level of financing PhD students at national level



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# Some already completed PhD thesis

Ivan Juran (2015.) Rape (*Ceutorhynchus napi* Gyllenhal, 1837) and stem (*Ceutorhynchus pallidactylus* Marsham, 1802) weevil - biology, ecology and control

Darija Lemić (2014.) Temporal and spatial influence on the genetic variability of western corn rootworm (*Diabrotica virgifera virgifera* LeConte Coleoptera: Chrysomelidae) population

Ivana Pajač Živković (2012.) Biology, ecology and genetics of codling moth (*Cydia pomonella* L.) populations in north-west Croatia

Maja Čačija (2015.) Distribution and dominance of species of the genus *Agriotes* in arable land in the continental Croatia

Zrinka Drmić (2016.) The sugar-beet weevil (*Bothynoderes punctiventris* Germar 1824., Col.: Curculionidae): life cycle, ecology and area wide control by mass trapping



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SVEUČILIŠTE  
U MOSTARU

# Some already completed PhD thesis

Kristijan Franin (2016.) True bugs fauna (Insecta: Heteroptera) in ecological infrastructure of vineyard

Nenad Novak (2017.) Allelopathic potential of segetal and ruderal invasive alien plants

Joško Kaliterna (2012.) "Identification, pathogenicity and distribution of fungal species from families Botryosphaeriaceae and Diaporthaceae on grapevine in Croatia"

Sara Godena (2013.) Viroses of autochthonous and introduced olive varieties (*Olea europaea* L.) in Istria and their impact on quality of virgin olive oil

Matija Goršić (2012.) Effect of the combinations of herbicide topramezone and adjuvants on *Abutilon theophrasti* Med., *Ambrosia artemisiifolia* L. and *Amaranthus retroflexus* L. in maize



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# Approved PhD topics

Milorad Vojvodić „Effects of the ban of neonicotinoids in the field crop production on pests occurrence, with special emphasis on the condition of bee colonies”

Helena Virić Gašparić „Neonicotinoid degradation dynamics in sugar beet plants grown from treated seeds and influence on harmful and beneficial fauna”

Vjekoslav Markotić „Fauna of the insects belonging to suborder Sternorrhyncha in citrus orchards in Republic of Croatia”

Ana Pintar „Biotest method for establishing the level of residues of mesotrion in two soil types”

Maja Novak „Alelopathic potential of the invasive allochthonic weed *Ailanthus altissima* Mill. Swingle”



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# Thank you for your attention !!!



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