

## **REGULATIONS OF DOCTORAL STUDIES TAUGHT IN ENGLISH LANGUAGE AT THE UNIVERSITY OF AGRICULTURE IN KRAKOW**

### **§ 1. General**

1. Regulations of the doctoral studies in the University of Agriculture in Krakow determine the organisation of doctoral studies, rights and obligations of doctoral students undertaking part-time studies conducted in English language.
2. The Rector may specify doctoral students rights and obligations concerning the model of studies if different than otherwise stated in the Regulations.

### **§ 2. Organisation of the programme**

1. The PhD study programme taught in English offered by the University of Agriculture (PhD programme), is offered to both Polish and international students.
2. The PhD programme is a 4-year programme, part-time, it can be also taught as an Individual Ph.D. Programme
3. The PhD programme is offered in the following areas:
  - a/Agriculture;
  - b/Forestry.
4. A candidate is admitted for studies in one of the above listed areas and is affiliated with one of the departments/institutes of the Faculty.
5. Each PhD student has his/her individual advisor – a professor employed at the Faculty.

### **§ 3. Supervision and administration of the programme**

1. The PhD programme is supervised by the Ph.D. Programme Board.
2. The Ph.D. Programme Board takes decisions regarding:
  - a) curriculum requirements,
  - b) academic rules,
  - c) admission procedure.
3. The PhD programme is administered by the Director of the PhD programme taught in English (the Director of the PhD programme). The Director of the PhD programme taught in Polish is also the Director of the PhD programme taught in English.

### **§ 4. Curriculum requirements**

1. The curriculum requirements are the same for all areas (disciplines) in which the programme is offered. The requirements are given in Appendix 1.
2. The programme is completed when the curriculum requirements given in Appendix 1 are satisfied and the submitted PhD Thesis is accepted by the students advisor.
3. The list of specific scientific areas are given in Appendix 2.
4. The list of advanced courses at the faculties are given in Appendix 3

5. The Study programme is given in Appendix 4

### **§ 5. Registration**

1. The monitoring of the student progress is carried out at the end of each year, resulting in a decision on the registration for the next year. This decision is taken by the Director of the PhD programme.
2. To be registered for the next year the students must:
  - a/ have at least 85% ECTS credit points earned from the beginning of the study.
  - b/ to be registered for the third year, the student must have the PhD track procedure initiated by the Faculty Council
3. The extension of the study period over 4 years requires an acceptance of the Dean and Director of the Ph.D. Programme.

### **§ 6. Dismissal from the programme**

1. A student is dismissed from the programme if:
  - a/ the registration requirements are not satisfied,
  - b/ the tuition fee is not paid on time.
2. The decision on student dismissal from the programme is taken by the Director of the PhD programme. Students and his/her advisor are informed about such intention at least one week before the decision is to be taken.
3. The decision on student dismissal is communicated to the student, to the Dean and to the Rector. The student has the rights to appeal the Director's decision to the Rector, within 14 days of its receipt.

### **§ 7. Student rights and duties**

1. The student of the PhD programme taught in English is not eligible for a doctoral scholarship funded by the University or its Faculty.
2. The student has the right to use all necessary facilities and materials and to request support from the administrative staff of the department/institute.
3. The student is required to be present in his/her office at times agreed with his/her advisor.
4. The students of the PhD programme taught in English can participate in elections of representatives of the PhD student community which take place at the Faculty and at the University.

### **§ 8. Individual study programme**

1. Each student pursues an individual study programme that specifies the set of courses for each semester. The individual study programme for each semester is developed together with and formally approved by the student's advisor.

2. The individual study programme in each semester can include a special Individual PhD Reading course taught by the student's advisor or by any other member of academic staff recommended by the student's advisor.
3. To pass the course, the student must take an examination or submit a report. The Individual PhD Reading course is classified as advanced.
4. The individual study programme in semesters 1-7 must include the Individual PhD Research course. The student's advisor is an instructor for this course.
5. To pass the course, the student must submit a report no later than two weeks before the beginning of the next semester. The report is graded by the advisor.
6. The individual study programme in semesters 1-6 must include the PhD Seminar. The student's advisor is an instructor for this Seminar. The PhD Seminar is assigned 1.5 ECTS credit points. To pass the course, the student must give a presentation on the topic related to his/her research.

### **§ 9. Other rules**

1. For issues not regulated in this document, general regulations concerning PhD study programmes and PhD students and the regulations and decisions issued by the bodies of the University and of the Faculty apply.

## § 10. Appendixes

### Appendix 1

#### Curriculum requirements

	<b>Hours / ECTS credit points</b>
Advanced courses in selected area (discipline)	105 / 13.5
General obligatory courses	135 / 11.5
Facultative courses (teaching methods, new technologies in education)	30 / 20
PhD seminar (Sem1, ..., Sem6)	90 / 8.5
Preparing publication+defence	20 / 2.5
Teaching practice	40 / 4
<b>total:</b>	<b>420 / 60</b>

## Appendix 2

### Specific areas

#### Ph.D. in Agriculture

##### **Faculty of Agriculture and Economics**

1. Biological plant protection
2. Biodiversity protection
3. Effects of fertilization on the quality of crop yields and soil environment
4. The impact of waste materials on the environment
5. Soil microbiology and soil nitrogen transformations
6. The impact of heavy metals on microbial biodiversity
7. Environmental management of industrial waste
8. Genesis, chemical and physical properties of soil derived from different parent materials
9. Plant Biotechnology
10. Plants as a source of functional compounds

##### **Faculty of Animal Sciences**

1. Biotechnological methods of animal growth and development stimulation
2. Problems concerning animal reproduction
3. Animal parazytology
4. Animal population modeling
5. Neuroendocrine regulation of physiological processes
6. Metabolic disorders as a consequence of high animal productivity
7. Animal welfare; solving the problems
8. Methods of control and evaluation of animal culture environment in respect
9. of microbiological and virusological state
10. Nutrigenomic

##### **Faculty of Food Technology**

##### Analysis of Food Quality and Safety

- Quality and properties of raw materials, semi-finished and final food products,
- Analytical methods in evaluation of quality and safety of food,
- Sensory analysis in food quality control,

- Starch – structure, properties, modification methods and functional properties of starch preparations,
- Rheological properties of food,
- Interactions between food components and their influence on the functional properties of food,
- Bioactive components of food,

### Food Biotechnology

- Efficiency of enzymatic preparations in poultry feeding evaluated *in vitro* and during feeding experiments,
- Optimization of biosynthesis of multiactive and multifunctional enzymatic preparations for feed industry,
- Products of enzymatic degradation of phytates as functional foods,
- Novel applications of enzymatic preparations in food and feeding,

### Food Engineering

- Study of rheological properties, directly in flow.
- Influence of solvent on the osmotic properties and intrinsic viscosity of solutions of different starches -modified or not.
- Study of textural and rheological properties of selected extrudates
- The mechanical characteristics of foams based on selected proteins with the addition of inulin.
- Durability of foams based on different proteins with the addition of selected hydrocolloids.
- Mixing of liquid food systems of thixotropic properties.
- Influence of process parameters on the mechanical properties of foams obtained using continuous foamer.
- Synthesis and properties of biodegradable hydrogels based on different starches - modified or not - and acrylic polymers.
- Evaluation of preparations of resistant starch, maltodextrins with varying degrees of saccharification of starch and modified starches in terms of their healthy action, and the possibility of using in the technology of baking gluten-free bread.
- The use of DSC to the analysis of the complex phase transitions.

### Food Refrigeration

- Optimization and improvement of technological processes in chilling and freezing of food,
- Food storage stability of raw materials and food of plant and animal origin. Accelerated evaluation of food stability,
- Computer-aided optimization of unit operations and processes in food technology,
- Application of enzymatic preparations for food proteins modification,
- Optimization and improvement of vitamin, drying and nutritional concentrates production from plant raw materials,

### Technology of Foods of Animal Origin

- Analysis of influence of pre- and post-slaughter factors on a slaughter value and quality attributes of meat of different animal species (pork, beef, veal, sheep, poultry and fish meats)
- Evaluation of endo- and exo- genous physico-chemical and biochemical changes of raw, slaughter materials.
- Analyses of microstructure and texture of meat and meat products.
- Elaboration of technologies of low-fat meat products with red meat, poultry and fish usage.
- Elaboration of technologies of meat products production with functional and pro-health characteristics.
- Designing of new meat products basing on traditional recipes
- Estimation of nutritional and sensory value of culinary meats and meat products.
- Influence of environmental factors on slaughter-houses and meats processing factories microflora growth
- Analysis of meats and meat products microflora composition
- Evaluation of different factors influence on technological suitability of cow's, ewe's, goat's and donkey's milks.
- Designing of fermented milk products and cheeses production technologies with improved functional properties.
- Factors influencing the cholesterol content in milk and dairy products
- Influence of selected factors on content of bioactive components in milk and fermented milk products.
- Usage of wheys for whey-fruit-vegetable fermented drinks production
- Texture and microstructure of dairy products
- Possibilities of usage of transglutaminase, of microbiological origin, in dairy processing
- Enrichment of dairy products in components with high antioxidative activity (teas, vegetables, herbs, oriental and wild fruits)
- Proteolysis in milk and dairy products
- Implementation of high hydrostatic pressure in milk processing
- Evaluation of presence of volatile compounds in cheeses
- Quality evaluation of dairy products originating from industrial and farmer's productions.

#### Technology of Fruits, Vegetables and Mushrooms

- Evaluation of usefulness in food production of fruit and vegetable species rarely cultivated in Poland,
- Evaluation of usefulness in food production of cultivated or wild mushrooms,
- Evaluation of influence of fruit, vegetable and mushroom processing and preservation on a biological, nutritional and sensory value of final products,
- New products from fruit, vegetables and mushrooms,
- Effect of agro-biological factors on the quality of raw materials used in the fruit and vegetable processing industry
- Bioactive components in fresh and preserved fruit, vegetables and mushrooms

#### Technology of Fermentation and Food Microbiology

- Profile of microbiota present during spontaneous fermentation processes, application of mixed cultures of microorganisms for alcoholic beverages production,
- Taste, aroma and other components of alcoholic and non-alcoholic beverages, stability of beverages
- Action of different biological and technological factors on a process of wort fermentation and formation of different components of beer,
- Optimization of processes with pectino-, amylo- and cellulolytic enzymes application,
- Application of killer yeasts and their toxins in fermentation processes, apoptosis of yeast,
- Optimization of different beverage production processes for improvement their prohealth properties, especially their antioxidant capacity,
- Biosorption of heavy metals by yeasts and cyanobacteria of *Arthrospira* genus,
- Application of different microorganisms for biosynthesis of selected compounds,
- Utilization of food industry wastes by microorganisms,
- Evaluation of antioxidant potential and antimicrobial properties of different plants and bee products,

### Carbohydrates Technology

- Studies of physicochemical and functional properties of polysaccharides of different botanical origin,
- Analysis of furan and furan derivatives in carbohydrates reach systems
- Analysis of honey quality and the influence of thermal treatment on its properties
- Technological usefulness of potatoes and potato starch,
- Technology of cereals processing and bakery,
- Technology of gluten-free products,
- Cyclodextrin chemistry and physicochemistry (modification, complexation),
- Non-food applications of carbohydrates,
- Analysis of bioactive components In cereal grain
- The structure and properties of non starch polysaccharydes in cereals

### Human Nutrition

- Evaluation of composition, nutritional value and functional features (prohealth) of food of plant and animal origin,
- Food toxicology,
- Evaluation of eating habits and nutritional status of selected groups of population,
- Food packaging,
- Application of modern analytical methods for evaluation of physicochemical and prohealth properties of food,

### Technology of Gastronomy and Food Consumption

- Preparation of research procedures and validation of analytical methods used for food analysis,
- Evaluation of nutritional value, bioactive substances content (vitamins, proteins, amino acids) and contaminants (heavy metals, pesticides, mycotoxins) in food,
- Properties of prohealth non-nutritional components of food, e.g. phenolic compounds, glucosinolates, dietary fiber, fructans.



### **Faculty of Horticulture**

1. Study on the pests and diseases of crop plants and the methods of their control.
2. Plants nutrition and soil fertilizations.
3. Regeneration of plants in *in vitro* culture, somatic embryogenesis.
4. Cryopreservation of ornamental plants.
5. Elaborating production technologies of selected ornamental plants.
6. Conditions of existence of native ornamental perennials.
7. Hortitherapy and green urban area.
8. Studies on micropropagation and regeneration from isolated protoplasts of different endangered, ornamental and other cultivated plant species.
9. Actions aimed on active conservation of endangered plant species: monitoring in situ, propagation ex situ to create collection or to reinforcement of population.
10. Effect of different growing factors (light conditions and post-harvest factors) on the biological and nutritional quality of vegetables.
11. Metabolism of phenolic compounds in vegetables affected by stress factors.
12. Increasing biodiversity of vegetable and medicinal plants in horticultural production.
13. Abiotic stresses in the growth and development of vegetable crops.
14. Polymer materials for plant and soil covering.
15. Biotechnology in plant breeding including applications of plant tissue cultures.
16. Production of double haploids.
17. Marker assistance breeding
18. Plant molecular genetic and genomic
19. Optimization of orchard production
20. Study on the behavioral ecology of honey bee

### **Ph.D. in Forestry**

#### **Faculty of Forestry**

1. Biology and ecology of forest populations, tree ring ecology, phytosociology, floristics.
2. Macro- and microelement cycling in forest ecosystems.
3. Effect of air pollution on mountain forests with particular regard to southern Poland; integrated forest monitoring.
4. Modelling forest growth and site productivity.

5. Reclamation and forest management of post-industrial wastelands and degraded areas.
6. Studies on microclimate and climate forming factors in various forest communities in mountain areas, the effect of acid rains on forest soils and young trees.
7. Forest soil resistance to anthropogenic factors.
8. Insect pests of conifer and deciduous trees, entomofauna of national parks and nature reserves.
9. Forests tree diseases – symptomatology, etiology and conditions for exacerbation of diseases processes.
10. Assessment of main forest forming species variability in the Carpathians, biological conditions for establishing gene banks for these species.
11. Improving methods of breeding assessment, maintenance and renovation of mountain forest stands.
12. Optimal and rational utilisation of forest raw material base, improving methods species composition of work organisation and ergonomics in forestry, modernisation of technological processes of timber and non-timber product acquisition with particular regard to mountain areas.
13. Biology and ecology of game, protected mammals and some birds.
14. Recreational function of forest and its role in the regional development.
15. Management of soil carbon and other soil properties via shift in the forest

### **Appendix 3**

Advanced courses –Specialisation subjects

#### **Ph. D. in Agriculture**

##### **Faculty of Agriculture and Economic**

1. Environmental Protection
2. Plant Protection
3. Plant breeding
4. Molecular background of crop production
5. Plant stress biology
6. Sustainable farming
7. Soil science and fertilization
8. Rural Development
9. Agroecology
10. Organic farming
11. Statistics and modeling
12. Environmental biotechnology
13. International Marketing
14. Fundamentals of Marketing

##### **Faculty of Animal Sciences**

1. Animal and Human Physiology and Endocrinology
2. Basic Scientific Nomenclature in Biochemistry, Physiology and Endocrinology
3. Introduction to Genetic Engineering
4. Biotechnology of Avian Embryo Development
5. Parasites of Domestic Animals
6. The Basics of Nutrigenomic
7. Computer Programs in Animal Nutrition
8. Forage Conservation
9. Basics of Animal Nutrition
10. Biological Clocks in Living Organisms
11. Phenomenon of Seasonality in Small Ruminants
12. Swine Breeding, Behavior and Welfare
13. In Vitro Culture of Animal Tissues and Cells
14. Decision Support Systems in Animal Management

### **Faculty of Horticulture**

1. Integrated protection of horticultural crops
2. Soilless cultivation systems
3. Polymers in horticulture
4. Plant Genomics
5. Embryology of flowering plants
6. Improvement of horticultural crops
7. Genetically modified organisms
8. Principles of plant tissue cultures
9. Biostatistics
10. Social insects ecology

### **Faculty of Food Technology**

1. Analysis of bioactive components in cereal grain
2. History of food (as a development of agricultural systems)
3. Polysaccharides - modern food components
4. Physical Chemistry of Macromolecular Food Components
5. Microwaves in Food Technology
6. Advanced applied enzymology
7. Current trends in food biotechnology
8. Chromatographic methods in food analysis
9. Freezing and chilling of foods
10. Food storage stability
11. Emerging technologies for food processing
12. Biotechnology of aroma compounds
13. Industrial microbiology
14. Meat and milk regional products
15. Atomic Absorption Spectrometry in Food Analysis
16. Brewing Technology

### **Ph.D. in Forestry**

#### **Faculty of Forestry**

1. Anthropogenic Effect on Forest Stand and Waters
2. Close-to-nature Silviculture

3. Contemporary Approaches in Conservation of Forest Biodiversity
4. Ecology of Invasive Plants
5. GEOMATICS - Remote Sensing
6. GEOMATICS – GNSS Global Navigation Satellite Systems
7. GEOMATICS - Digital Photogrammetry
8. Management of Mountain Uneven – aged Forests
9. Population Ecology of Trees
10. Reclamation and Ecology of Post-mining and Post-industrial Sites
11. Soil Enzymology
12. Forest Productivity
13. Experimental design for the life sciences research

Appendix 4

**THE STUDY PROGRAMME**

Eight semesters, 420 hours, 60 ECTS, extramural		
<b>Semester 1</b>	<b>60hrs</b>	<b>5.5ECTS</b>
Methodology of scientific research	15hrs	1.5ECTS
Developing research in biology	15hrs	1.5ECTS
Specialization seminar		
Formulating of research problem	15hrs	1ECTS
Statistical analysis of quantitative data	15hrs	1.5ECTS
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<b>Semester 2</b>	<b>60hrs</b>	<b>5.5ECTS</b>
Application of computer software in data analysis	15hrs	1ECTS
Specialization seminar		
First draft of the research proposal	15hrs	1.5ECTS
Methodology of scientific research	15hrs	1.5ECTS
Specialization subjects	15hrs	1.5ECTS
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<b>Semester 3</b>	<b>45hrs</b>	<b>5.5ECTS</b>
Specialization subjects	30hrs	4.5ECTS
Specialization seminar	15hrs	1.5ECTS
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<b>Semester 4</b>	<b>50hrs</b>	<b>5.5ECTS</b>
Specialization seminar	15hrs	1.5ECTS
Specialization subjects	15hrs	1.5ECTS
Presentation of the doctoral candidates research results		
Successful preparation of papers for publication in scientific journals/proceedings	15hrs	2ECTS
Successful preparation and defense of doctoral dissertation opening	5hrs	0.5ECTS
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<b>Semester 5</b>	<b>75hrs</b>	<b>8.0ECTS</b>
Specialization seminar	15hrs	1.5ECTS
Presentation of the doctoral candidates research results		
Philosophy	30hrs	2ECTS
Specialization subjects	30hrs	4.5ECTS
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<b>Semester 6</b>	<b>60hrs</b>	<b>5.0ECTS</b>
Specialization seminar	15hrs	1.5ECTS
Specialization subjects	15hrs	1.5ECTS
Presentation of the doctoral candidates research results		
Basic economy	30hrs	2ECTS

<b>Semester 7</b>	<b>15hrs</b>	<b>10ECTS</b>
Facultative course: Teaching methods	15hrs	10ECTS
Individual doctoral seminars with supervisor		
<b>Semester 8</b>	<b>15hrs</b>	<b>10ECTS</b>
Facultative course:		
New technologies in education	15hrs	10ECTS
Individual doctoral seminars with supervisor		
Teaching practice	40hrs	4ECTS