Courses taught in English

Academic year: 2017/2018

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<th>Course title</th>
<th>Semester</th>
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<tr>
<td>Z-ZEMI Agriculture Microbiology</td>
<td>W or S</td>
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<td>Z-AGKLI Agroclimatology</td>
<td>W or S</td>
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<tr>
<td>Z-AGRT Agrotourism</td>
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<td>Z-AZE Alternative Energy Sources</td>
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<td>Z_CAL_P Analytical Chemistry</td>
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<td>Z-AMOR Anatomy and Morphology of Plants</td>
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<td>Z-AFYZ Anatomy and Physiology of Farm Animals</td>
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<td>Z-GEZI Animal Genetics</td>
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<td>Z-ABIOKL Applied Bioclimatology</td>
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<td>Z-CBI Biochemistry</td>
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<td>Z-CHSK Cattle Husbandry</td>
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<td>Z-DT Dairy Technology</td>
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<td>Z-OCHZP Environmental Protection (taught in English and/or Italian!)</td>
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<tr>
<td>Z-OAG</td>
<td>Organic Agriculture</td>
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<td>Z-PRZE</td>
<td>Precision Agriculture</td>
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<td>Z-FOD</td>
<td>Principles of Fodder Production</td>
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<td>Z-RADO</td>
<td>Radioactive Waste</td>
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<td>Z-RADEK</td>
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<td>Reproduction of Farm Animals</td>
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<td>Z-CHOK</td>
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<td>Z-PED</td>
<td>Soil Science</td>
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<td>Z-SFPAT</td>
<td>Special Phytopathology</td>
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<td>Z-PASTS</td>
<td>Tropical and Subtropical Pastures</td>
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<td>Z-WCPW</td>
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<td>Z-ZOOL</td>
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Courses labelled as taught in W/S are taught in winter/summer (autumn/spring) term only.
Courses labelled W or S are taught in both terms.
A course runs provided there are enough students registered.
**Agricultural Microbiology**

**Content:** The course acquaints students with basic problems regarding general as well as applied microbiology paying special attention to plant growing, farm animal husbandry and processing of plant and animal products. Discovery of the microbial world. Biochemistry of microbial cells, their functional anatomy, genetics and dynamics of growth. Microbial metabolism: enzymes, catabolic and biosynthetic processes. Microbial ecology: effect of abiotic factors, interactions between microorganisms and plants, microbial interactions with animals. Microorganisms and some novel pollution problems. Microorganisms in their natural habitats: air, water and soil microbiology. Role of microorganisms in biogeochemical cycling of carbon, nitrogen, phosphorus and sulphur focusing special attention on the agroecosystems. Soil fertility and soil sickness. Microflora of fodders and organic fertilizers. Microbial aspects of composting of plant and animal wastes. Useful properties of microbial preparations, enzymes and secondary metabolites in agricultural practice.

**Teacher:** Ing. Jaroslav Záhora, CSc.
Department of Agrochemistry, Soil Science, Microbiology and Plant Nutrition

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 6

**Method of assessment:** Written and oral examination

**Agroclimatology**

**Content:** To educate students in methods of measurement and evaluation of the meteorological and agrometeorological observations and also in methods of an agroclimatological evaluation of the environment including the agrometeorological zonation. Students will be taught to apply acquired knowledge of the subject into growing technologies and will learn basic principles of utilization of crop growth simulation models.

**Teacher:** prof. Ing. Zdeněk Žalud, Ph.D.
Department of Agrosystems and Bioclimatology

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 6

**Agrotourism**

**Content:** To provide information on tourism in country, on business possibilities and forms of application of higher education knowledge. Outstanding specialists are invited as guest lecturers. Seminars are pooled into blocks and students take part in trips to places of agrotourism in the Czech Republic and Austria. The course provides complex information on agrotourism which is necessary to start agrotourism business. The course deals with legislation, service provision, management, forms of agricultural production and its economy. The stress is put on the role of agrotourism in protection of environment and development of Czech countryside.

**Teacher:** Ing. Vladimír Mikule, Ph.D.
Department of Animal Breeding

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/1

**ECTS Credits:** 4
**Alternative Energy Sources**

**Content:** Main goal of the course is to give an overview and division of alternative energy sources. To provide overall knowledge of an alternative energy sources utilization, describing advantages and disadvantages with close connection to the economic evaluation. The environmental, energy and economical links to alternative energy sources are discussed. Using solar energy in direct and indirect application is presented. Energy of water, wind, oceans and geothermal energy usage is discussed. Terms like heat pumps, co-generation and their application are explained. Important part of the course deals with energy of biomass, alternative fuels for internal combustion engines, such as biodiesel and hydrogen. Application in fuel cells is presented as well. Theoretical base of this course is in principal physics level, students are acquainted with basic methods of energy consumption calculations, concluding in the economic evaluation of the alternative energy source utilization and investment evaluation.

**Teacher:** doc. Ing. Martin Fajman, Ph.D.  
Department of Engineering and Automobile Transport  
**Language:** English  
**Semester:** S  
**Hours of lectures/seminars per week:** 2/2  
**ECTS Credits:** 5

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**Analytical Chemistry**

**Content:**

**Teacher:** prof. Hana Dočekalová  
Department of Chemistry and Biochemistry  
**Language:** English  
**Semester:** S  
**Hours of lectures/seminars per week:** 2/0  
**ECTS Credits:** 4

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**Anatomy and Morphology of Plants**

**Content:** The structure of vascular plants from the level of single cell to the level of whole organism. Cell wall and protoplast, membranes organelles, cytoskeleton. Division and growth of the cell, cell cycle. Plant tissues – classification according to cell wall and shape, and according to functions. Root, stem, leaf, flower, seed and fruit – functions and external and internal organization. Plant reproduction (sexual, apomixis, asexual). Life cycles.

**Minimum of 3 students registered is necessary to open the course!**

**Teacher:** prof. RNDr. Ladislav Havel, CSc.  
Department of Plant Biology  
**Language:** English  
**Semester:** W or S  
**Hours of lectures/seminars per week:** 2/2  
**ECTS Credits:** 5
Anatomy and Physiology of Farm Animals

Content: The aim is to obtain knowledge about the structure and function of organism that are important for the animal husbandry. The subject covers information about the structure of organism (cell, tissue, organ systems) and about its function (function of body fluids, circulation, respiration, digestion, resorption, metabolism, respiration, thermoregulation, reproduction, lactation, neuroendocrine control).

Teacher: Ing. Petr Sláma, Ph.D.
Department of Anatomy, Physiology and Animal Genetics
Language: English
Semester: W or S
Hours of lectures/seminars per week: 2/3
ECTS Credits: 7

Animal Genetics

Content: Students should learn about genetics of farm animals, understand principles of genetic variability and master genetic mechanism on molecular and cellular levels as well as on levels of individuals and populations. They also should be able to interpret this knowledge and use it actively in their breeding work. Application of genetics in breeding of farm animals. Genotypic and genetic structure of populations, changes in frequencies of genes (selection, migration, mutation, efficient size of a population, inbreeding. Characterisation of quantitative traits in a population, components of genotypic variance, environmental variance, correlations and interactions between genotype and environment. Genetic parameters of populations, their importance. Genetic aspects of estimation of breeding value, calculation of genetic parameters, non-linear and positional effects, heterose and recombination effects, inbreeding depression. Genetics of health and resistance of farm animals to diseases. Genetics of cattle, pigs, horses, sheep and poultry - alternative traits, polymorphism of DNA and proteins, marker genes and QTL, genetic maps, genetics of production traits. Genetics and biodiversity, protection of gene reserves.

Teacher: doc. Ing. Ing. Tomáš Urban, Ph.D.
Department of Anatomy, Physiology and Animal Genetics
Language: English
Semester: S
Hours of lectures/seminars per week: 2/2
ECTS Credits: 6

Applied Bioclimatology

Content: In this course we apply system approach in order to analyze interactions between living organisms, soil and atmosphere from the level of individual crops and populations of plants and animals up to the interactions between segments of landscapes or regions. As the system is looked upon from bioclimatological perspective the course tends to concentrate on the role of climate (and weather) in these processes. After the course the students will be able to understand better to impacts of various meteorological situations and climate parameters that are determining the landscape stability and often limit the agrosystem productivity. Almost one half of the lectures is then dedicated to explain causes and impacts of global climate change and to extreme meteorological events both in the region of the Central Europe and globally.

The seminar work consists of case studies aimed at exercising practical methods of agriculture meteorology that enable e.g. to predict crop yield, estimate date of infestation of pests or to determine climatic niche of selected plants and animals. Key part of the seminars is to introduce students into the advanced meteorological instruments through interactive demonstration and especially during individual student’s assignments using modern measurement devices. The content of English courses depends on number and background of the students.
Biochemistry

Content: The course of biochemistry deepens the knowledge about structure of living systems and their metabolism. It reveals structure of enzyme molecules, forms of their occurrence, their localization, mechanisms of their action and regulation. The course familiarizes student with classification and nomenclature of the enzymes and with estimation of their catalytic activity. The main attention is aimed on metabolism of saccharides (glycolysis, pentose cycle, photosynthesis), of lipids (triacylglyceroles, fatty acids) and nitrogen containing molecules (aminoacids metabolism, ammonium detoxification, proteosynthesis, proteolysis). In addition, the course describes secondary metabolism and principles of biochemical regulation. Laboratory practise acquaint students with sampling and preparing of biological samples and with main biochemical methods (enzyme kinetics, gel electrophoresis, immunochemical methods, electrochemistry, liquid chromatography).

Department of Chemistry and Biochemistry
Language: English
Semester: W
Hours of lectures/seminars per week: 2/4
ECTS Credits: 8

Cattle Husbandry

Content: To introduce main aspects of production management and non-production functions of cattle. The aim of the course is to introduce cattle as a significant part of the agricultural system and a food producer. The main production traits, such as fertility, milk and meat production and factors affecting them are described. Students are given an overview of the most important cattle breeds, especially those kept in the Czech Republic. The system of breeding measures taken to secure the breeding progress in cattle herds and population is presented. Management of all categories of cattle, i.e. cows, calves, heifers and beef is discussed. The ecological, production, economic and ethological aspects of systems of rearing and breeding of cattle in both dairy and beef herds are emphasized.

Teacher: Ing. Daniel Falta, Ph.D.
Department of Animal Breeding
Language: English
Semester: W or S
Hours of lectures/seminars per week: 2/3
ECTS Credits: 7

Dairy Technology

Content: Dairy technology describes the technology, physics, chemistry and microbiology of pasteurised and long-life milk, cream, butter, cheese, condensed milk, milk powder, yoghurt and other fermented milk beverages, ice cream and other dairy products. This subject is segmented at lectures and laboratory exercises.
1. Collection and reception of milk.
5. Introduction to cheese making - tradition and basic knowledge, acid and sweet coagulation of protein, terminology for classification of cheese.
6. Cheesemaking models - milk collection, milk treatment, standardisation, additives in cheesemilk (starter), curd production, renneting, cutting the coagulum, final removal of whey and principles of curd handling, final treatment of curd - pressing, salting, ripening and storage of cheese.
7. Sort of cheese - fresh cheese, semi-hard cheese, hard cheese, surface mould-ripened cheese, blue cheese, pasta-filata cheese.
12. Ice cream - categories of ice cream, the ice cream process.

Key words: milk, fermented milk products, cheese, yoghurt, cream, milk powder, condensed milk, ice cream, dairy technology

Teacher: doc. Ing. Květoslava Šustová, Ph.D.
Department of Food Technology
Language: English
Semester: W or S
Hours of lectures/seminars per week: 2/1
ECTS Credits: 6

Environmental Protection


Teacher: doc. Ing. Dr. Milada Šťastná
Department of Applied and Landscape Ecology
Language: English and/or Italian
Semester: S
Hours of lectures/seminars per week: 2/2
ECTS Credits: 5

Farm Animal Husbandry

Content: To provide information on biological and technological background and management of most important farm animal breeds and production traits of cattle, pigs, poultry, sheep and goats. The course introduces technology used in animal production systems, external and internal factors affecting organism. Students learn terminology and etology, welfare and ethics of animal production issues are discussed as well as legislation concerning animal protection. Students gain elementary knowledge on variability of production traits, breeding and reproduction of farm animal species. Methods of evaluation of growth, meat, milk and egg production and reproduction are introduced.
Students take part in field trips to various farms and enterprises where they are shown systems of technology used in cattle, pig, poultry and sheep farming.

**Teacher:** Ing. Daniel Falta, Ph.D.  
Department of Animal Breeding  
**Language:** English  
**Semester:** W  
**Hours of lectures/seminars per week:** 2/2  
**ECTS Credits:** 6  

**Fish Culture**

**Content:** To acquire detailed knowledge about culture of individual fish species in connection with rational pond management including ecological and economical aspects of fishery. The course will start with review of historical evolution of fisheries with respect to its progress in the Czech Republic. Special attention is paid to the technology of carp production, including reproduction and culture. Within the framework of this course technologies and processes involved in culture of other commercial fish species, stock enhancement of running waters and the role of individual fish species in the market will be discussed. The last part of the course is devoted to pond fertilization and intensive fish culture, organized harvesting of the fish produced in the pond, fish transport and maintenance. Practical part of the course will focus on common activities in the field of fisheries management. Excursions and practical trainings in some selected fish farms will supplement the course.

**Teacher:** prof. Dr. Ing. Jan Mareš  
Department of Zoology, Fisheries, Hydrobiology and Apiculture  
**Language:** English  
**Semester:** S  
**Hours of lectures/seminars per week:** 2/2  
**ECTS Credits:** 5  

**Food Analysis**


**Teacher:** doc. Ing. Jan Pospíchal, CSc.  
Department of Chemistry and Biochemistry  
**Language:** English  
**Semester:** S  
**Hours of lectures/seminars per week:** 2/4  
**ECTS Credits:** 8
Food Engineering

**Content:** Food Engineering is a theoretical subject. The course objective is to acquaint the students with basic principles of food processing. The introductory lessons deal with material and energy balances, heat transfer and liquid transport. The topics of the individual lectures are: dosing, mixing and forming, mechanical separations (filtration, centrifugation, sedimentation), extraction, distillation, crystallisation, heat processing using steam and water (heat exchangers, blanching, pasteurisation, heat sterilisation, evaporation) and heat processing using hot air (dehydration, baking and roasting), chilling and freezing. Hygrothermal properties of food materials, incl. the effect of water activity on food and mechanism of drying (heat and mass transfer, EMC/ERH) are demonstrated using a special laboratory dryer. Technical calculations and utilisation of diagrams i-s (steam), log p-i (cooling agent) and psychrometric chart (Molliere diagram) are topics of seminars.

**Teacher:** doc. Ing. Jiří Štencl, DrSc.
Department of Agricultural, Food and Environmental Engineering

**Language:** English

**Semester:** S

**ECTS Credits:** 5

Food Chemistry


**Teacher:** doc. RNDr. Ing. Pavel Stratil, Ph.D.
Department of Chemistry and Biochemistry

**Language:** English

**Semester:** W

**ECTS Credits:** 4

General Phytopathology


**Teacher:** prof. Ing. Radovan Pokorný, Ph.D.
Department of Crop Science, Breeding and Plant Medicine

**Language:** English

**Semester:** W or S

**ECTS Credits:** 6
General Plant Production

**Content:** Vegetation and production factors, site characteristics, partition of the CR territory into production regions, crop production zoning, agrobiological characteristics of major field crops and their incorporation into crop rotations, soil tillage and stand establishment, weed control, systemic approach in arable farming, and crop production history. Students obtain deeper knowledge about plant production, its practical running and special management on farms (agricultural enterprises) and are acquainted with agronomic principles of sustainable arable farming. The subject provides groundwork for subsequent specialized subjects.

**Teacher:** prof. Ing. Jan Křen, CSc.
Department of Agrosystems and Bioclimatology

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 5

Grassland Management

**Content:** Grassland in Europe and the world, knowledge of disciplines to combine the issue of crop and livestock production. Graduates will gain knowledge of the treatment, restoration of grasslands and their maintenance, they will learn of grazing cattle, sheep, goats and horses. Graduates able to give advice on pasture management and working on farms with grazing livestock.

**Teacher:** doc. Ing. Jiří Skládanka, Ph.D.
Department of Animal Nutrition and Forage Production

**Language:** English

**Semester:** W

**Hours of lectures/seminars per week:** 2/2

**ECTS credits:** 5

Herbology

**Content:** Characteristics of weed groups, their harmfulness, usefulness, propagation, dissemination. Current problems of weed infestation. Relationships between the most common crops and weeds. Weed management - prevention and direct control treatments. Herbicides – characteristics and possibilities of their use. Agronomic and economic effectiveness of individual weed management treatments and their impacts on the environment. Weed control under different farming practices (conventional, integrated, ecological, precision). Students obtain deeper knowledge about biological properties of field weeds, their economical importance, occurrence, possibilities and methods for weed control, and its impacts on the environment.

**Teacher:** Ing. Vladimír Smutný, Ph.D.
Department of Agrosystems and Bioclimatology

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/1

**ECTS Credits:** 4
**Horse Husbandry**

**Content:** To gain knowledge on horse husbandry and breeding of required types of horse. The course is focused on development of horse husbandry, elements of creation of production types and breeds of horse, changes and present trends in use of horses. Students are introduced to principles of horse breed identification; particulars of horse anatomy evaluation; the description of the most significant horse breeds and their production traits; horse husbandry in the Czech Republic; principles, forms and methods of horse breeding; technology of rearing and breeding, grazing system; handling and training of horse performance evaluation; methods of selection and economy of horse husbandry. Students take part in two day-long trips focused on horse husbandry in the Czech Republic and selection of horses according to their performance. Two practical field trips allow students to take part in horse type evaluation, mechanics and irregularities of movement, description of horse.

**Teacher:** Ing. Eva Sobotková, Ph.D.
**Department:** Department of Animal Breeding
**Language:** English
**Semester:** W
**ECTS Credits:** 5

**Hydrology and Hydraulics (in Spanish)**

**Content:**
1. Introduccion a la Hidrologia (Procesos y depositos en el ciclo hidrologico; Importancia del agua en la Tierra: regulacion de la distribucion de energia y de los seres vivos. Ecohidrologia)
2. Lluvia, nieve, rocio y evaporacion: el agua en la atmosfera (Rasgos principales de la atmosfera; Procesos de condensacion y evaporacion del agua en la atmosfera; Formacion de rocio, lluvia y nieve; Interceptacion de la lluvia por la vegetation; Lluvia media de la cuenca; La reserva de agua en la nieve)
3. Distribucion temporal y espacial en Hidrologia (Probabilidad en Hidrologia; Variabilidad espacial en Hidrologia)
4. Infiltracion y generacion de escorrentia: el agua en el suelo (Comportamiento hidrologico del suelo; Generacion del exceso de lluvia; Redistribucion y evaporacion del agua en el suelo)
5. Circulacion subterranea del agua (Flujo del agua en acuíferos; Descarga de acuíferos: interaccion con rios y lagos; Recarga de acuíferos)
6. Escorrentia superficial (Caracterizacion hidrologica de la cuenca; Respuesta hidrologica de la cuenca; Hidrograma unitario; Circulacion del agua en la cuenca. Efectos de canales y embalses)
7. Recarga y descarga del suelo y analisis de cuencas: modelos hidrologicos (Modelos de recarga. Balances de agua; Modelos de circulacion de flujos en la cuenca)
8. Hidraulica (Fórmula de Chézy; Ecuacion de continuidad; Principio de Bernoulli)

**Teacher:** Ing. Petra Oppeltová, Ph.D.
**Department:** Department of Applied and Landscape Ecology
**Language:** Spanish
**Semester:** W
**ECTS Credits:** 6

**Chemistry**

**Content:** Aim of study is to obtain knowledge about general chemistry and chemistry of inorganic, organic, natural and macromolecular compounds, their structures, characters and their role in nature. Students should be able to understand the relationship between structure of compounds and their physic-chemical properties. Students should be trained in basic laboratory operations and proper using chemical nomenclature. Structure of atoms and molecules, origin and kinds of chemical bound.
Inorganic and Analytical Chemistry

**Content:** Aim of study is to obtain knowledge about inorganic and analytical chemistry (particularly qualitative and quantitative analysis). Basic information about theory and application of instrumental analytical methods used in agriculture and related fields is obtained. The course makes the students acquainted with basic problems of inorganic and analytical chemistry. Inorganic part explains structure of atoms, origin and kinds of chemical bonds, kinds of chemical reactions, periodic system, basic characteristics of selected elements and their compounds. Analytical part explains theoretical basis of qualitative and quantitative analysis, sample preparation for analysis, gravimetric and volumetric methods, instrumental - optical (polarimetry, refractometry, photometry, atomic spectroscopy), electrochemical (potentiometry, conductimetry, polarography) and separation (extraction, gas and liquid chromatography, electromigration methods) methods. Students use theoretical knowledge of analytical methods in work in chemical laboratory (sample preparation, gravimetry, volumetry, photometry, potentiometry, conductimetry and separation methods).

**Teacher:** doc. Ing. Jan Pospíchal, CSc.
**Department of Chemistry and Biochemistry**

**Language:** English

**Semester:** W

**ECTS Credits:** 6
Hours of lectures/seminars per week: 2/4
ECTS Credits: 8

Landscape Ecology

Main goals: To define landscape as a phenomenon; to identify problems of landscape utilization and to create knowledge basement for students to be able individually propose a solution of these problems. There is an applied character of the subject emphasized; therefore a space is devoted to basic connections of landscape ecology to other research fields.

The lectures are divided into 12 thematic blocks. Knowledge is deepened and applied on specific case studies/examples by interactive teaching techniques during practices. Part of the practice might be an excursion focusing on evaluation methods of land use. Semestral assignment will be required.

1. Ecology in relation to landscape
   - Landscape as a subject of the study, different approach and perception of the landscape, genesis of landscape ecology as an trans-disciplinary science.
   - Landscape as a complex form (geocomplex) and system (geosystem), landscape units and components, landscape factors, natural landscaping processes, ecosystems and geosystems, landscape. attributes as a self-regulation system, landscape homeostasis.

2. Space structure of landscape and its changes
   - Vertical and horizontal structure of landscape, hierarchy of landscape units, individual and typological landscape signs, primary, secondary and tertiary landscape structure.
   - Changes of landscape structures. Landscape evolution, its dynamic and rhythmic, landscape evolution in Quaternary, role of man in historical context.
   - Landscape typology.

3. Landscape and human
   - Basic function of landscape related to human, complex landscape potential, creation of cultural landscape, landscape load and its limits, natural and civilization disturbance.
   - Changes of cultural landscape. Degrees of anthropogenic landscape changes, reversible and irreversible changes, character of disrupted and devastated landscapes, degradation a regeneration processes in landscape. Ecology of recovery, biotope reclamation in cultural landscape, natural renaturalization, directed succession.
   - Landscape and environment protection. Extra protected areas.

4. Landscape diagnoses and prognosis
   - Information sources about landscape areas, databases, GIS, landscape ecological monitoring, data interpretation and evaluation, identification of problems and conflicts of interest in landscape, risk estimation, EIA/SEA, methods of natural values appraisal.
   - Conceptions of recovery for landscape ecological stability. Conceptions of Act No. 114/1992 Coll, on the protection of nature and landscape (ÚSES), key words, methods, experiences / case studies, similar programs abroad, EECONET. Types and function of landscape greener.
   - Landscape planning – introduction.
   - Landscape scenarios – introduction.

5. Landscape and space planning
   - Evolution of space planning – historical point of view.
   - Landscape versus land planning. Definitions and interpretation of basic terminology.
   - Land planning – legislation, theoretical basis and practical application.

6. Landscape planning
   - Landscape planning methods. Methods, content and standards of a landscape plan. Preventive landscape protection.
   - Strategic, regional and community planning.
   - Complex land reallocation as a tool of space planning. New organization of soil fund and road net, land blocking, liquidation of dispersed green, landscape unification, changes of landscape character. Anti-erosion control measures, positive and negative impacts of landscape reclamation. Problems of chemicalization in agriculture.
   - Countryside renewal

7. Agricultural landscape
   - Agro-ecosystem -- basic determination
   - Ecologization in agriculture. Ecologization trends in recent agriculture, alternative agricultural technology, sustainable agriculture and forestry. Double role of a farmer in landscape. Agro-environmental programs.
   - Sustainable farming in landscape -- vision of sustainable landscape farming within national and international connectivity.

8. Landscape and countryside
   - Determination of rural areas -- criteria, situation in Czech Republic and in the world.
   - Indicators typical for rural areas -- estate and tendency
   - Sustainable development of rural landscape (Cork declaration). Agrarian politic and its reflection in rural landscape.
   - Politic of regional development.

9. Urban landscape
• Problems of urban environment. Suburbanization.
• City versus countryside. Descriptive and exact comparison.
• Brownfields. Definition. Cause of BF initiation. Types of BF. BF regeneration.

10. Landscape creation programs in CZ. European funding
• Function and assurance of landscape creation programs. Experiences, successes and problems of its realization. Landscape cultivation program, revitalization of river systems, rural (village) renewal program.
• Coordination of land creation programs and documents. Interlacing of urbanistic and landscape structures, role of complex land reclamations. Problems of farming in areas with specific management.
• Structural EU funds, Norwegian funds etc.

11. Landscape politic. European convention about landscape.
12. Landscape and tourism
• Impacts of tourism on landscape. Role of local autonomy in tourism.
• Desirable form of tourism. Certification of services in tourism.
• Geo-parks.

Teacher: doc. Dr. Ing. Milada Šťastná
Department of Applied and Landscape Ecology
Language: English
Semester: W
Hours of lectures/seminars per week: 2/2
ECTS Credits: 5

Optimising Diets with PC

Content: The aim of course is to introduce principles and pre-conditions of model creation, optimisation and simulation models for feed mixtures, feed diets and production of feeds. Students practical use Software for optimising of feed production for farm (small, average or big). The aim of course is to introduce principles and pre-conditions of model creation, phases of model creation, aiming and selection of instruments, optimisation, structural and simulation models. Individual variant solution analysis, sensitive analysis, parameterisation, selection of optimal variant for implementation in process of optimising diets and feedstuffs base. Optimising diets for cattle, pigs, horse and poultry. Software: Excel, Mixit II, NRC (1998, 2001), Degussa AminoDat and AminoCow, KDS, OKD, OKS, Agrokonzulta Žamberk, Solomix, e.t.c.

Teacher: prof. Ing. Ladislav Zeman, CSc.
Department of Animal Nutrition and Forage Production
Language: English
Semester: S
Hours of lectures/seminars per week: 0/4
ECTS Credits: 4

Organic Agriculture

Content: The aim of the course is to acquaint students with philosophy, objectives and principles of organic agriculture, broader theoretical knowledge of functions and relationships in agroecosystems (relations to landscape, soil, water and biodiversity); to acquaint with history, development and current position of organic agriculture under conditions of the Czech Republic and European Union. Acquaint students with basic legal standards valid for farming in organic agriculture; to elucidate principles of supervision and certification processes. To explain differences and specificities between conventional and organic farming, i.e. principles of plant production with emphasis on crop rotations and differences in plant nutrition, importance and main principles of farm animal breeding in relation to nutrient balance in the organic farming system, plant protection strategy in relation to approved processes and weed management. Students will be acquainted with productivity of organic agriculture and economic aspects of organic farming enterprises. Principles of bio-food production and problems of bio-food market will be explained. The aim is to teach students the principles of sustainable soil management
Organic agriculture – objectives, importance, history and presence, multifunctional agriculture, sustainable development, differences between conventional and organic farming system, use of bioproduction, legal standards of organic agriculture, supervision and certification.

**Teacher:** Ing. Tamara Dryšlová, Ph.D.
**Department:** Department of Agrosystems and Bioclimatology
**Language:** English
**Semester:** W or S
**ECTS Credits:** 5

**Organic Chemistry**

**Content:** Aim of study is to obtain knowledge about chemistry of organic, natural and macromolecular compounds, their structures, characters and their role in nature. Students should be able to understand the relationship between structure of compounds and their physico-chemical properties. Students should be trained in basic laboratory operations and proper using chemical nomenclature. Organic structures, structure of molecules (isomerism), organic reactions (electron-effects, mechanisms of a reactions). Chemistry of organic compounds. Hydrocarbons (carbon-carbon single, double and triple bounds), aromatic hydrocarbons. O-derivatives (alcohols, phenols, aldehydes, ketones, carboxylic acids, ethers, esters, hemiacetals). N-derivatives (amines, nitro-derivatives). S-derivatives. Heterocycles. Chemistry of natural compounds. Saccharides. Lipids. Peptides. Chemistry of macromolecules, biopolymers and synthetic polymers.

**Teacher:** doc. Ing. Jan Pospíchal, CSc.
**Department:** Department of Chemistry and Biochemistry
**Language:** English
**Semester:** W
**ECTS Credits:** 6

**Organic Systems of Animal Breeding**

**Content:** The aim of the course is to inform students about problems associated with organic breeding of farm animals, animal welfare and ethics. Students will learn about systems of organic animal production as operated in accordance with the EU regulations and with possibilities of their application under conditions of the Czech Republic. The most important topics are as follows: organic breeding of individual species of farm animals, animal welfare, ethology of farm animals, elimination of negative environmental effects of animal production, marketing of organic products and economic aspects of organic animal production.

**Teacher:** Ing. Zdeněk Hadaš, Ph.D.
**Department:** Department of Animal Breeding
**Language:** English
**Semester:** S
**ECTS Credits:** 6
Physics I, II

Content: Acquisition of basic physical standards and knowledge, required for following study. Ability of individual analyzing of technical problems and practical application of physical laws. Subject is divided into six main following parts: Mechanics, Hydromechanics, Thermodynamics, Electricity, Magnetism and Basic modern Physics. Practical demonstration of measurement of physical and technical values is a part of laboratory practice. Results of the measurements must be technically and statistically processed in a special protocol which includes graphical interpretation. The oral examination is focused on logical interrelationship and continuity of various physical values and formulas and their relation to technical use.

The students will be asked to sit an easy introductory examination before they are allowed to enroll in the course!

Teacher: doc. RNDr. Stanislav Bartoň, CSc.
Department of Engineering and Automobile Transport
Language: English
Semester: W or S
Hours of lectures/seminars per week: 2/2, 2/2
ECTS Credits: 6

Phytopathology and Entomology


Teacher: prof. Ing. Radovan Pokorný, Ph.D.
Department of Crop Science, Breeding and Plant Medicine
Language: English
Semester: W or S
Hours of lectures/seminars per week: 3/3
ECTS Credits: 8

Plant Anatomy and Physiology


**Teacher:** prof. RNDr. Ladislav Havel, CSc.
Department of Plant Biology

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 6

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**Plant Breeding**

**Content:** The objective of the subject is explanation of the significance of genetic diversity in plants, description of genetic improvement of plants and application of genetic potential of new varieties by certified seeds in practice.

**Teacher:** Ing. Pavlína Smutná, Ph.D.
Department of Crop Science, Breeding and Plant Medicine

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 2/3

**ECTS Credits:** 7

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**Plant Physiology**

**Content:** The understanding of the basic metabolic, growth and development functions of plant body parts and their mutual coordination. Principles of the most important metabolic processes like transport of substances, nutrition, respiration, photosynthesis, movement, growth and development, stress reactions and environmental adaptation. In practical courses, the chosen experiments illustrate principles concerned with the most general aspects of plant physiology and show basic methods of determination problems. The topics are stress metabolic and growth function which influences specificity of plant parts important for economy.

**Teacher:** prof. Ing. Stanislav Procházka, DrSc.
Department of Plant Biology

**Language:** English

**Semester:** W

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 5

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**Precision Agriculture**

**Content:** Use of spatial heterogeneity of fields - possibilities of measurements and diagnostics. Synchronization of growth and development processes with dynamics of soil processes - measurements and diagnostics. Equipment for sensing the stand and soil status, different application of fertilizers and pesticides, and soil tillage. Transmission of data from a machine to the place where data are evaluated (application maps, yield maps). Work with software and high-tech for precision farming (GPS, GIS). Agronomic utilization of results obtained using methods for precision farming, interpretation of results, estimation of economic effects. Students are acquainted with modern technologies and mechanization for crop growing in arable farming systems, possibilities of their use for increasing economic effectiveness, and decreasing adverse environmental impacts.

**Teacher:** Ing. Karel Klem, Ph.D.
Department of Agrosystems and Bioclimatology
Principles of Fodder Production

**Content:** The objective of this course is to obtain basic information about yield formation and commercial characteristics of important perennial and annual fodder crops grown on arable land and on permanent grassland (meadows and pastures) as well as about their productional and non-productional functions.

**Teacher:** Ing. Stanislav Hejduk, Ph.D.
Department of Animal Nutrition and Forage Production

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Radioactive Waste

**Content:** To acquaint the students with original, actual and potential sources of contamination of radioactive waste and with their effects in agriculture, the food industry and forestry, with the system of monitoring radio-contamination in the waste, with standards (legislation) and the handling of biological waste contaminated with radio-nuclides. The student will apply this information in the protection of agricultural, food and forest production against radioactive waste, including procedures necessary to handle contaminated agricultural products. The content of lectures is the character of radioactive waste: types, sources and biogenic migration of radio-nuclides, effects on organisms, detection methods; protection and international cooperation in the protection of waste against sources of radioactive radiation in agricultural and forest production. In the practical workshops (incl. video-programmes, discussions and excursion to an radio-monitoring works) the students will learn the properties and detection of radioactive radiation, analysis of radioactive contaminated waste and protection of the waste against sources of ionizing radiation.

**Teacher:** prof. RNDr. Michael Pöschl, CSc.
Department of Molecular Biology and Radiobiology

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Radioecology

**Content:** The course acquaints the students with actual and potential sources of radioactive material, contamination of the environment, specific effects of ionizing radiation on organisms, biogenic migration of radionuclides and protection of soil, crop plants and farm animals from the negative effects of the pollutants. This knowledge can be used in environmental protection against radionuclides (sources of ionizing radiation) and in application of the nuclear phenomenon in human activities focused on agriculture, food processing and forest management.

**Teacher:** prof. RNDr. Michael Pöschl, CSc.
Department of Molecular Biology and Radiobiology

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Reproduction of Farm Animals

**Content:** To provide complex theoretical knowledge on reproduction in major farm animal species and to gain practical skills in management of reproduction process. The course develops students’ preliminary theoretical knowledge. It provides theoretical and partly practical knowledge of examination, processing and preservation of ejaculate in laboratory. Insemination, pregnancy diagnosis and the course of pregnancy in cows, sows, mares, sheep, goats and bitches is described. Insemination, pregnancy diagnoses and the course of gravidity in cows, sows, mares, sheep, goats and bitches are described. Students learn about the process of parturition, post-parturition care of females and a period of puerperium. Terms such as induced heat, synchronization of heat, conception, embryo preservation and transfer and use of other biotechnologies are explained. It describes theory of biological, technical and legal background of successful insemination, embryo transfer and other kinds of bio- technological methods.

**Teacher:** prof. Ing. Ladislav Máchal, DrSc.
Department of Animal Breeding

**Language:** English

**Semester:** W

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 5

Rural Development

**Content:** The subject is focused on basic aspects of rural development in both developed and developing countries. It contains fundamentals of regional development theory, characteristics and differentiation of the countryside in regional frames, consequences of contemporary urbanization and migration processes in different parts of the World for the rural development, impacts of the first and second demographic transition on the rural development, an overview of problems of rural communities, rural families and gender aspects, a view to rural constructions and rural planning and possible politics of rural development.

**Teacher:** doc. RNDr. Antonín Vaishar, CSc.
Department of Applied and Landscape Ecology

**Language:** English

**Semester:** S

**Hours of lectures/seminars per week:** 2/2

**ECTS Credits:** 7

Sheep and Goat Breeding

**Content:** To provide complex theoretical and practical information on goat and sheep breeding in both large and small scale farms. Students are given overall knowledge on sheep and goat husbandry which includes: actual situation, trends and prospects of sheep and goat breeding in the Czech Republic and Europe; home and foreign goat and sheep breeds and there importance in selection and hybridization programmes; meat, milk and wool production in sheep; milk, meat and to some extent wool production in goats; technique and technology in production systems of all age categories of sheep and goats wit respect to welfare of animals; economy of goat and sheep farming.

**Teacher:** prof. Dr. Ing. Jan Kuchtík
Department of Animal Breeding

**Language:** English

**Semester:** W or S

**Hours of lectures/seminars per week:** 1/2
ECTS Credits: 4

Soil Science

**Content:** The aim of this course is to educate students as how to look at soil as an individual natural formation, created by regular developments, compounds of mineral and organic particles. Soil forms a living environment for microbes, site for plants and regulator of material cycle. Students should be aware that soil is a dynamic and still developing system. The course introduces students to soil as an essential element of food chain and currently as an environment for growing plants. It is its importance as a water storage and its ability to clean water. It shows soil as an environment which affects the life of microbes regarding its physical and biological properties. Organic soil matter is explained as the store of carbon, nitrogen and other macroelements. Their accessibility for plants is affected by microbiological mineralization and immobilization. students will be introduced to the role of soil in ecosystem stability, its influence on flow and balance of substances and energy, its buffer role at withholding, degradation and loosening dangerous elements. Students will too be introduced to soil taxonomy.

**Teacher:** doc. RNDr. Lubica Pospíšilová, CSc.
**Department of Agrochemistry, Soil Science, Microbiology and Plant Nutrition**

**Language:** English

**Semester:** S

**ECTS Credits:** 6

Special Phytopathology

**Content:** The most important environmental factors that cause plant diseases: temperature, moisture, precipitations air and soil pollution, nutritional deficiencies in plants. Most important diseases caused by viruses, phytoplasmas, fungi, bacteria. Origin, biology and ecology of pathogens. Diseases of field crops (cereals, sugar beet, potatoes, sunflower, pulse crop, oil seed rape, fodder crops etc.). Disease of horticultural plants (apple trees, pear trees, stone fruits, different berry fruits, main specials of vegetables). Methods and measures of integrated control (biological, chemical, resistant cultivars, crop rotation, and others).

**Teacher:** prof. Ing. Radovan Pokorný, CSc.
**Department of Crop Science, Breeding and Plant Medicine**

**Language:** English

**Semester:** W or S

**ECTS Credits:** 6

Tropical and Subtropical Pastures

**Content:** Students will gain knowledge of cattle and small ruminants grazing in the tropics and subtropics. Discussed will be issue of tropical grasses and legumes, their cultivation, utilization and quality of forage. Knowledge about forages and feed will be supplemented by systems of animal breeding on the farms using pastures. Will be discussed also the issue of the influence of the tropical environment and nutrition on the physiological functions of animals. The knowledge and skills will increase the competence graduates for agricultural consultancy in the tropics and subtropics and increase the competence for management of farms with grazing systems of cattle and small ruminants in the tropics and subtropics.

**Teacher:** doc. Ing. Jiří Skládanka, Ph.D.
**Language:** English

**Semester:** S

**ECTS Credits:** 6
**Water Contamination and Protection of Water Sources (in Spanish)**

**Content:** The students will gain knowledge in the field of water contamination and protection of surface and groundwater source, problems of protection zones of water sources, nitrate vulnerable zones, as well as about the issue of matters of state administration in water management. After completing the course, the students will be able to make laboratory analysis of the water sample and spectrophotometry establish the value of basic chemical and physical water quality indicators and to orientate in Europe water legislation.

**Teacher:** Ing. Petra Oppeltová, Ph.D.
**Language:** Spanish
**Semester:** S
**Hours of lectures/seminars per week:** 2/2
**ECTS Credits:** 5
Zoology

Content: To acquire the theoretical basic knowledge of zoology for other specialised agricultural disciplines and practical information of direct application. The student obtains a review of general zoology (cytology, histology, organology, ontogeny and phylogeny), zoogeography, domestication, ecology and ethology. An essential part of lectures is devoted to the systematics zoology with a special regard to taxa important in agricultural practise (Protozoans, Plathelminths, Nematelminths, Annelids, Molluscs, Arthropods and Vertebrates). The attention is paid to species of both negative (agricultural and store pests, parasites, vectors) and positive practical importance (edaphic animals and domesticants). The practical courses are focused in identification of animal species, in their life cycles and ecology.

Teacher: Ing. Vladimír Hula, Ph.D.
Department of Zoology, Fisheries, Hydrobiology and Apiculture

Language: English
Semester: W or S
Hours of lectures/seminars per week: 2/2
ECTS Credits: 6