University of Zagreb Faculty of Agriculture
Svetošimunska cesta 25, 10000 Zagreb
Phone: +385 (0)1 2393 777
E-mail: dekanat@agr.hr
Web: www.agr.unizg.hr

Field Crops Management (146055)

Course coordinator

Asst. Prof. Marina Brčić, PhD

Course description

The course consists of several teaching units: Introduction, Cereals, Grain legumes, Root and tuber crops, Oilcrops, Fiber crops, Aromatic and alkaloid crops. Within these teaching units, will be given information about the importance of particular crops, taxonomy, use, response to the environment, crop management (crop rotation, tillage, fertilization, sowing, plant protection, and harvest). Also, information about the impact of crop management on yield formation and seed quality will be given.

ECTS: **6.00**

English language: **L3**

E-learning: **L1**

Teaching hours: 60
Lectures: 29
Auditory exercises: 5
Practicum: 8
Seminar: 18

Lecturer

- Asst. Prof. Marina Brčić, PhD
- Prof. Ana Pospišil, PhD
- Prof. Jasminka Butorac, PhD

Associate teacher for exercises

- Asst. Prof. Marina Brčić, PhD
- Prof. Ana Pospišil, PhD
- Prof. Jasminka Butorac, PhD

Associate teacher for seminars

- Asst. Prof. Marina Brčić, PhD
- Prof. Ana Pospišil, PhD
- Prof. Jasminka Butorac, PhD

Grading

Sufficient (2): 60-70%
Good (3): 71-80%
Very good (4): 81-90%
Excellent (5): 91-100%

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Type of course

- Graduate studies / Environment, agriculture and resource management (Compulsory course, 3 semester, 2 year)

General competencies

Students will adopt new knowledge and skills necessary for successful crop production in different production conditions. They will be able to critically consider the impact of applied practices on the environment, the possibility of reducing particular practices for preservation of the environment while achieving optimum yield.

Types of instruction

- Lectures
- Auditory Exercises
- Seminars

Learning outcomes

Learning outcome	Evaluation methods
Knowledge of the state and trends in the production of field crops	seminar
Select the crops and cultivars / hybrids suitable to the given environmental conditions	seminar
Plan and design crop rotation in different cropping systems	exam
Independently create management practices in field crops production (tillage, fertilization, planting, care and protection of crops)	exam
Apply appropriate practices in order to reduce the impact of management practices on environmental pollution	seminar, exam
Distinguish management practices in conventional and sustainable (integrated) crop production	seminar, exam
Identify the most important weeds, diseases and pests of the field crops	seminar, exam
Independently determine the optimal time for harvest of the field crops	exam
Interpret the interdependency of management practices, stages of development and growth and yield components	exam
Be familiar with quality standards and basic procedures for processing crops.	seminar, exam

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Working methods

Teachers' obligations

Performing lectures and exercises, and examining.

Students' obligations

Participation in lectures and making the seminar (oral presentation and written text).

Methods of grading

Evaluation elements	Maximum points or Share in evaluation	Grade rating scale	Grade	Direct teaching hours	Total number of average student workload	ECTS
Test 1	50%	60-70% 71-80% 81-90% 91-100%	Sufficient (2) Good (3) Very good (4) Excellent (5)	30	90	3
Test 2	50%	60-70% 71-80% 81-90% 91-100%	Sufficient (2) Good (3) Very good (4) Excellent (5)	30	90	3
Total	100%			60	180	6

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Weekly class schedule

1. Cropping systems. The relationship of crop production and the environment. Production and use of cereal crops (wheat, rye, barley, oats and triticale). Biological properties of cereal - response to water, temperature and soil. Cropping systems. The relationship of crop production and the environment. Production and use of cereal crops (wheat, rye, barley, oats and triticale). Biological properties of cereal - response to water, temperature and soil. Cropping systems and management practices in cereals production: crop rotation, tillage, fertilization, sowing. The relationship between the development stages and management practices.
2. Selection of cereals varieties for sowing. Seeding rates calculation. Weeds, pests and diseases protection. Impact of management practices on environment and biodiversity.
3. The relationship of conventional and integrated cropping systems of cereal crops. The projection of crop rotation in the cropping system by introducing cover crops. The impact of introducing cover crops on the environment. Production and use of maize, sorghum, millet and buckwheat. Biological properties of cereals - response to temperature, water and soil. Cropping systems and management practices in maize production: crop rotation, methods of soil preparation for sowing of maize in different crop rotations and production conditions.
4. Introduction of cover crops in maize cropping systems. Influence of cover crops on the production of maize and the environment. Creating the crop rotation with included cover crops. Fertilization for growing maize - the determination of fertilizer quantity, the impact of the way and time of application of fertilizers on the environment, hybrids selection, sowing date and sowing density for maize.
5. GMO hybrids in maize production. Maize harvest depending on the use. Protection from weeds, pests and diseases. The impact of management practices on biodiversity. Cropping systems and management practices in the production of sorghum, millet and buckwheat. Role of those cereals in integrated crop production. The relationship of conventional and integrated cropping systems of sorghum, millet and buckwheat.
6. Production and use of grain legumes (soybean, lupins, faba beans). Biological properties of soybean, lupines and faba beans - response to water, temperature and soil. The role of grain legumes in cropping systems. Impact of management practices on the environment. GMO soybean cultivar in production. Cropping systems and management practices in the production of soybean.
7. Cropping systems and management practices in the production of lupins and faba beans. Impact of management practices on the environment. Production and use of potatoes. Cropping systems and management practices in the production of potatoes. Impact of management practices on the environment. The possibility of growing potatoes on unfavorable soils (saline and acid soils).
8. Selection of potato varieties. Potato seed calculation. Calculation of interrow space. Test of the first part of the module. Production and use of sugar beet. By-products of sugar beet production. Chemical composition and technological quality of roots. Environvental requirements.
9. Cropping systems and management practices in sugar beet production (crop rotation, tillage, fertilization, variety selection, planting, care and protection, sugar beet harvest). Impact of management practices on the environment. Production and use of chicory. Chemical composition of roots. Environmental requirements. Management practices in the production of chicory and their impact on the environment.
10. Production and use of oilseeds (rapeseed, sunflower, oil pumpkin). The fatty acid composition, standards of quality raw materials. Yield components of rapeseed. Environmental requirements of rapeseed. Conventional and unconventional cropping systems in production of rapeseed. The relationship of conventional and integrated cropping systems. Protection from weeds, diseases and pests.

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11. Management practices in the production of rapeseed and its impact on the environment. Yields components, development stages of sunflower. Environmental requirements. Cropping systems and management practices in the production of sunflower. Protection against weeds, diseases and pests. Impact of management practices on the environment.
12. The relationship of conventional and integrated cropping systems in the production of sunflower. Environmental requirements of oil pumpkin. Management practices in the production of oil pumpkin and their impact on the environment. Harvesting and drying of oil pumpkin seeds. Production and utilization of fiber plants (hemp, flax and cotton); Physical and chemical characteristics of fibers; Environmental requirements; Environmental and health and safety considerations; Implications for future research or future trends.
13. Variety recommendations; Crop rotation, seedbed preparation and seeding, cultivation and weed management, irrigation, nutrient requirements, fertilizers, pulling or harvesting; Retting and turning, rippling or deseeding, baling and stocking, scutching, tow processing, ginning, cotton seed processing; Impact on environment. Production and utilization of tobacco; The diversification of tobacco (method of curing, type of tobacco and it' s use); Environmental requirements; Environmental and health and safety considerations; Current and future status of tobacco.
14. Variety recommendations; Crop rotation, seedling production in the float system, seedbed preparation and planting, cultivation and weed management, irrigation, nutrient requirements, fertilizers, topping and suckering, harvesting and ripeness, curing; Impact on environment Organoleptic and physical properties of tobacco leaf
15. Chemical properties of tobacco leaf, tobacco smoke Production and use of hops, hops products. Environmental requirements for growing hops. Management practices in growing hops and their impact on the environment. Harvest, drying and processing. Chemical composition and quality of strobiles. Test of the second part of the module.

Obligatory literature

1. Wheat and wheat improvement. 1987. Editor E. G. Heyne, Agronomy no. 13, Madison, USA Corn and corn improvement. 1977. Editor G. F. Sprague, Agronomy no. 18, Madison, USA Boerma H. R., Specht J. E. 2004. Soybeans: Improvement, production and uses, Third edition, Number 16 in the series Agronomy, Madison, Wisconsin, USA
2. Vreugdenhil D. 2007. Potato biology and biotechnology, advances and perspectives. Elsevier, UK, Netherlands
3. Draycott, A. P. 2006. Sugar Beet. Blackwell Publishing. Sunflower Technology and Production. 1997. Editor Albert A. Schneiter, Agronomy no. 35, Madison, Wisconsin, USA Genome Mapping and Molecular Breeding in Plants - Oilseeds 2007. Editor Chittaranjan Kole, Springer-Verlag Berlin Heidelberg
4. Franck, R. R. (2000). Bast and other plant fibres. Woodhead Publishing Limited. Cambridge, UK
5. Smith, C. W. and Cothren J.T. (1999). Cotton – Origin, History, Technology and Production. John Wiley and Sons. Inc., USA
6. Davis, D. L. and Nielsen, M. T. (1999). Tobacco – Production, Chemistry and Technology. Blackwell Science Ltd.
7. Tso, T. C. (1992). Production, Physiology and Biochemistry of Tobacco Plant. Ideals, Inc., Beltsville, Maryland, USA

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Recommended literature

1. Ranalli, P. (1999). Advances in Hemp Research. Food Products Press and The Haworth Press Inc., New York and London
2. Shekhar Sharma H. S. and van Sumere C. F. (1992). The Biology and Processing of Flax. M Publications, Belfast, UK

Similar course at related universities

- Field Crops, University of Natural Resources and Life Sciences, Vienna (BOKU)
- Field Crops Technology, Czech University of Life Sciences, Prague
- Principles of Crop Sciences II, University of Hohenheim
- Plant Production, University of Padova

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