

# Study program N0811A370002 - Sustainable Agriculture and Food Security (AGRIFOM)

## MSc. full time course

Program guarantor: doc. Ing. Jaroslav Havlík, Ph.D.

### 1st year

	Subject	ECTS	WS	SS
AVA43E	Animal Physiology	5	2/2 E	
ACA12E	Biochemistry	5	2/2 E	
AGA47E	Experimental Design and Statistics	5	2/2 E	
ABA26E	Environmental Physiology of Plant	5	2/2 E	
AWA38Z	Start up module	1	0,7/0 C	
AQA59E	Sustainability in the Food Chain	3	1/1 E	
	1x Compulsory Optional Subject group 1	5	WS or SS	
ARA42E	Alternative Agriculture	5		2/2 E
ARA46E	Crop Management Systems	5		2/2 E
AQA03Z	Excursion	1		1 day C
ACA13E	Food Chemistry *	6		2/3 E
ASA48E	Livestock Management	5		2/2 E
AWA64Z	MSc. Thesis I *	5		125 hours C
AUA59Z	Practical Diploma Training	5		125 hours C
EHI03E	Rural Development	5		2/2 E
AHA17E	Soil and Plant Relationship	5		2/2 E
66 + optional subject (5) = 71 C				

\* The subject can also be studied as the part of double degree, in the 1st year, summer semestr in Pisa,  
See the table below

### 1st year, summer semestr – CZU students in Pisa

	Subject in Pisa	ECTS		Equivalent subject in CZU
Pisa	Animal Food Quality	6	AQA60E	Quality Assessment of Animal-Based Foods
Pisa	Food Composition and Analysis	6	ACA13E	Food Chemistry
Pisa	Microbial Food Biotechnology	6	AMA18E	Special Food Biotechnology
Pisa	Thesis	12	AWA64Z	MSc. Thesis I
			AWA63Z_1	MSc. Thesis II (WS)

### 2nd year

	Subject	ECTS	WS	SS
AMA09E	Agricultural and Environmental Microbiology	5	2/2 E	
AVA54E	Animal Biotechnology	3	1,3/0,5 E 2tc	
ACA06E	Environmental Analytical Chemistry	5	2/2 E	
AQA25E	Food Quality and Food Safety	5	2/2 E	
AQA55E	Quality Assessment of Plant-Based Foods	5	2/2 E	
AWA63Z	MSc. Thesis II *	6+6	150 hours C	150 hours C
	1x Compulsory Optional Subject group 2	min. 4	WS or SS	
	1x Compulsory Optional Subject group 3	min. 5		Only SS
AQA62E	Advanced Technology in Food Processing	5		2/2 E
AKA34E	Food, Beverages and Dietary Supplements	5		2/2 E
AMA18E	Special Food Biotechnology *	5		2/2 E
50 + optional subjects (min 9) = 59 C in total 116 + optional subjects (min 14) = <b>130C</b>				

\* The subject can also be studied as the part of double degree, in the 1st year, summer semestr in Pisa, see the table above

### List of optional subjects – group 1

	Compulsory optional subject	ECTS	WS	SS
ATA33E	Sustainable Agriculture	5	2/2 E	
AAA30E	Weed Science	5	2/2 E	
AEA38E	Fish Systematics	5		2/2 E

### List of optional subjects – group 2

	Compulsory optional subject	ECTS	WS	SS
AAA41E	Advanced Meteorology and Climatology	5	2/2 E	
ADA21E	Poultry Management	5	2/2 E	
AKA39E	Sensory Analysis of Food	4	1/2 E	
APA22E	Soil Taxonomy, Survey and GIS	5		2/2 E

### List of optional subjects – group 3

	Compulsory optional subject	ECTS	WS	SS
AQA66E	Quality of Animal Products ** (only for students from Pisa)	9		2/4, 24s E
AQA60E	Quality Assessment of Animal-Based Foods *	5		2/2 E

\*\* The student chooses 1 subj. from the group of courses in order to obtain 5 credits in this group 3. At the same time, the course Quality of Animal Products is intended only for students from the University of Pisa.

\* The subject can also be studied as the part of double degree, in the 1st year, summer semester in Pisa, see the table above

Explanation: WS = Winter semester; SS = Spring semester; E = Examination; C = Credited, S = seminar, fp = field practice, e = excursion

The student should enrol in the Erasmus + program and should spend one semester abroad at one of our sister universities. If a student has an approved "Learning Agreement" (list of courses at a sister university) by Study Program guarantor then all fulfilled equivalent courses at a foreign university are accepted and he/she do not need to complete these courses from the curriculum here above.

### State exam

#### Study program N0811A370002 – Sustainable Agriculture and Food Security (AGRIFOM)

Subject of the SE (corridor)	Subjects of the corridor
Sustainable Agriculture	Sustainability in the Food Chain
	Alternative Agriculture
Food Quality and Food Chemistry	Food Quality and Food Safety
	Quality Assessment of Plant-based Food
	Quality Assessment of Animal-based Foods
Food Technology and Biotechnology	Special Food Biotechnology
	Advanced Technology in Food Production
	Food, Beverages and Dietary Supplements
Diploma thesis defence	

# Study program N0811A370028 – Danube AgriFood Master (DAFM)

## MSc. full time course

Program guarantor: doc. Ing. Martin Kulhánek, Ph.D.

### 1st year - CZU

	Subject	ECTS	WS	SS
AVA54E	Animal Biotechnology	3	1,3/0,5 E 2fp	
ACA12E	Biochemistry	5	2/2 E	
AWA39Z	Online courses 1	3	2/0 C	
AWA38Z	Start up module	1	0,7/0 C	
	At least 15 Credits from Compulsory elective courses	min. 15	WS or SS	
	At least 12 Credits from Elective courses (all subjects only from one thematic area)	min. 12	WS or SS	
AQA62E	Advanced Technology in Food Processing	5		2/2 E
ARA46E	Crop Management Systems	5		2/2 E
ACA13E	Food Chemistry	6		2/3 E
AWA42Z	Internship in the studied field *	3		C
AWA40Z	Online courses 2	3		2/0 C
AHA17E	Soil and Plant Relationship	5		2/2 E
AWA43Z	Winter / Summer school *	3		C
(36-42) + min. 27 C. Elective c. = 63-69 Cr.				

\* it can be studied in the 2nd year

### 2nd year – ULST or SUA or BOKU or UNS or UNIZG

	Subject	ECTS	WS	SS
AWA42Z	Internship in the studied field **	3	WS or SS	
AWA43Z	Winter / Summer school **	3	WS or SS	
	Subjects study ULST or SUA or BOKU or UNS or UNIZG	X	WS or SS	
(6) + Compulsory courses (min. X Cr.)				
in total 69 + El. subj. (min 51) = <b>120 C</b>				

\*\* if not studied in the first year

### List of Compulsory elective courses (1st year – CZU)

		ECTS	WS	SS
AMA09E	Agricultural and Environmental Microbiology	5	2/2 E	
AHA39E	Environment Pollution and Remediation	5	2/2 E	
APA21E	Soil Conservation and Protection	5	2/2 E	
ATA33E	Sustainable Agriculture	5	2/2 E	
EED06E	Agricultural Policy	5		2/1 E
AMA18E	Special Food Biotechnology	5		2/2 E

### List of Elective courses (1st year – CZU)

	<b>Thematic area: Food Safety and Consumer Science</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AQA25E	Food Quality and Food Safety	5	2/1,8 E 2fp	
AQA55E	Quality Assessment of Plant-Based Foods	5	2/2 E	
AKA39E	Sensory Analysis of Food	4	1/2 E	
AQA59E	Sustainability in the Food Chain	3	1/1 E	
AKA34E	Food, Beverages and Dietary Supplements	5		2/2 E
AQA60E	Quality Assessment of Animal-Based Foods	5		2/2 E
	<b>Thematic area: Sustainable Agriculture</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AEA17E	Agricultural Ecology	4	2/1 E	
ACA06E	Environmental Analytical Chemistry	5	2/2 E	
AAA30E	Weed Science	5	2/2 E	
AEA38E	Fish Systematics	5		1,3/3 E
ASA48E	Livestock Management	5		2/2 E
	<b>Thematic area: Soil, Water and Climate</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AAA41E	Advanced Meteorology and Climatology	5	2/2 E	
AIA05E	Hydrogeology	5	2/2 E	
AIA05Z	Excursion (only with AIA05E Hydrogeology)	1	1 day C	
APA17E	Modelling in Soil Science	5	2/2E	
APA22E	Soil Taxonomy, Survey and GIS	5		2/1,7 E 4 fp
AIA04E	Soil and Water Relationship	5		2/2 E
AIA04Z	Excursion (only with AIA04E Soil and Water Relationship)	1		1 day C
	<b>Thematic area: Intercultural learning</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
ZUX01E	Landscape Ecology	5	2/2 E	
EEEF1E	World Economy and Agriculture	5	2/1 E	
EREX4E	Human Resource Management	5		2/1 E
AZA36E	Landscaping	5		2/2 E
EHEA3E	Rural Development	5		2/1 E

Explanation: WS = Winter semester; SS = Spring semester; E = Examination; C = Credited, S = seminar, fp = field practice, e = excursion

<b>Education provided by partner universities</b>					
<b>Compulsory courses</b>					
Subject		Credits	University	Year / semester	
Biochemistry and Organic Chemistry		7	MATE	1/WS	
Integrated Crop Production I.		7	MATE	1/WS	
Biotechnology		7	MATE	1/WS	
Agrochemistry - Plant Nutrition		7	MATE	1/WS	
Food Process Control in the Food Industry		7	MATE	1/SS	
Food Toxicology		7	MATE	1/SS	
Advanced food processing techniques		4	ULST	2/WS	
Nutritional biochemistry		2	ULST	2/WS	
Nutritional cooking and chrononutrition		2	ULST	2/WS	
Novel food - design and development		4	ULST	2/WS	
Traditional food products		2	ULST	2/SS	
Experimental techniques and research		2	ULST	2/SS	
Nutrition for special category of consumers		2	ULST	2/SS	

Food Adulteration and Authentification		4	SUA	2/WS	
Genetically Modified Food		6	SUA	2/WS	
Foodborne Diseases		4	SUA	2/WS	
Accreditation and Certification in Food Industry		4	SUA	2/SS	
Ecological plant protection		3	BOKU	2/WS	
Food microbiology for safety in food chain (SIFC)		4	BOKU	2/WS	
Food chemistry (for SIFC)		4	BOKU	2/WS	
Soils and global change		4	BOKU	2/WS	
Intercultural communication		3	BOKU	2/SS	
Soil Resources		6	UNS	2/WS	
Chemistry		6	UNS	2/WS	
GIS Applications in Land Consolidation		6	UNS	2/SS	
Livestock production and the environment		3	UNIZG	2/WS	
Rhizosphere ecology		3	UNIZG	2/WS	
Organic farming		6	UNIZG	2/SS	
Environmental soil science		6	UNIZG	2/SS	
<b>Compulsory elective courses</b>					
Environmental Hygiene		7	MATE	1/WS	
Microbiological safety and quality of food production		7	MATE	1/WS	
Sustainable Agriculture		7	MATE	1/WS	
Food safety risk analysis		7	MATE	1/SS	
Agricultural Policy		7	MATE	1/SS	
Soil inventory		7	MATE	1/SS	
<b>Elective courses</b>					
Nature and Landscape Conservation		7	MATE	1/WS	
Plant Protection Strategies and Systems		7	MATE	1/WS	
Integrated Wildlife and Habitat Management		7	MATE	1/WS	
Drought Management		7	MATE	1/WS	
GIS Applications in Natural Resource Management		7	MATE	1/WS	
Protection of Surface and Subsurface Waters		7	MATE	1/WS	
Crop Weed Control		7	MATE	1/SS	
Wildlife Tourism and Economics		7	MATE	1/SS	
Conflict Management in Wildlife Conservation		7	MATE	1/SS	
Crop Pests		7	MATE	1/SS	
Fish Production in Ponds		7	MATE	1/SS	
Rural Extension		7	MATE	1/SS	
Basics of the European Union		7	MATE	1/SS	
Hungarian Language and Culture		7	MATE	1/SS	
Introduction to Ecotoxicology		7	MATE	1/SS	
Systems for Environmental Quality Assurance and Condition Assessment		7	MATE	1/SS	
Complex Food analytical methods		7	MATE	1/SS	
Advances in Food Toxicology and Food Authenticity		2	ULST	2	
Hygienic design in food factory		2	ULST	2	
Advanced techniques in food microbiology		2	ULST	2	
Food chemistry – food authenticity		2	ULST	2	
Modern techniques in food packaging and labelling		2	ULST	2	
Practice		2	ULST	2	
Research		2	ULST	2	
Hygienic design in food factory		2	ULST	2	
Food chemistry - food authenticity		2	ULST	2	

Modern techniques in food packaging and labelling		2	ULST	2	
Advances in food toxicology and food authenticity		2	ULST	2	
Advanced techniques in food microbiology		2	ULST	2	
Biodiversity Conservation		2	ULST	2	
Soil water and climate change		2	ULST	2	
Intercultural interferences in different learning process		2	ULST	2	
Multilinguism and interculturality		2	ULST	2	
Bioactive Metabolites of Microorganisms		2	SUA	2	
Hygiene of Nutrition and Alimentation		2	SUA	2	
Poultry and Minority Animal Products Processing		2	SUA	2	
Sampling of Foods		2	SUA	2	
Nutrigenomics		2	SUA	2	
Sensometrics and Informatics in Food Science		2	SUA	2	
Health Safety Aspects of Food		2	SUA	2	
Food Chemistry		2	SUA	2	
Food Microbiology		2	SUA	2	
Food Safety		2	SUA	2	
Risk Assessment		2	SUA	2	
Food Technology of Animal Products		2	SUA	2	
Food Control and Legislation		2	SUA	2	
Food Mycology		2	SUA	2	
Technology of Foodstuffs of Plant Origin		2	SUA	2	
Food Toxicology		2	SUA	2	
Administrative Law in Food		2	SUA	2	
Practical training in food microbiology for SIFC		2	BOKU	2	
Practical course in food processing		2	BOKU	2	
Food chemistry (for SIFC)		2	BOKU	2	
Human nutrition		2	BOKU	2	
Food chemistry practical course for SIFC		2	BOKU	2	
Molecular biology for food analysis		2	BOKU	2	
Food authenticity practical course		2	BOKU	2	
Validation of cleaning processes and hygienic design		2	BOKU	2	
National and international food safety authorities		2	BOKU	2	
Plant biotechnology		2	BOKU	2	
Biochemical and biotechnological methods (analytics design)		2	BOKU	2	
Quality management in biotechnology		2	BOKU	2	
Safety aspects of plant biotechnology		2	BOKU	2	
Genetically modified organisms in the environment		2	BOKU	2	
Methods in environmental biotechnology		2	BOKU	2	
Global waste management I		2	BOKU	2	
Global waste management II		2	BOKU	2	
E-business in the agriculture and food value chain		2	BOKU	2	
Development innovation		2	BOKU	2	
Organic horticulture (vegetables and ornamentals)		2	BOKU	2	
Medicinal and aromatic plants		2	BOKU	2	
Animal production in organic agriculture		2	BOKU	2	
Standards, certification and accreditation in organic farming		2	BOKU	2	
Plant and environment		2	BOKU	2	

Production systems and atmospheric pollution		2	BOKU	2	
European regulatory framework for organic production		2	BOKU	2	
Local knowledge and ethnobiology in organic farming – introduction		2	BOKU	2	
Molecular phytopathology		2	BOKU	2	
Aquaculture in practice – lectures and field trips		2	BOKU	2	
Ethics in organic agriculture		2	BOKU	2	
Ecology and population biology of plants in agro-ecosystems		2	BOKU	2	
Water resources planning and management		2	BOKU	2	
Soil physics and chemistry		2	BOKU	2	
Soils and food security		2	BOKU	2	
Soil conservation and soil protection		2	BOKU	2	
Soil erosion models and their application		2	BOKU	2	
Soil fertility and Soil ecology in organic agriculture		2	BOKU	2	
Soils and landscape		2	BOKU	2	
Ecological river landscape management		2	BOKU	2	
On site solution for water supply and sanitation		2	BOKU	2	
Environmental impacts on riverine ecosystems I		2	BOKU	2	
Human impacts in riverine landscapes		2	BOKU	2	
Hydrobiology		2	BOKU	2	
Selected projects in meteorology		2	BOKU	2	
Disaster management		2	BOKU	2	
Renewable energy resources		2	BOKU	2	
Practical course in energy engineering		2	BOKU	2	
Geothermal energy – geological fundamentals and applications		2	BOKU	2	
Resource efficiency and bioeconomy of bio-based materials		2	BOKU	2	
Multiple criteria decision making in natural resource management		2	BOKU	2	
Valuation methods for natural resources		2	BOKU	2	
Mediated modelling for sustainability		2	BOKU	2	
Field trip – rural water management		2	BOKU	2	
Presenting at a scientific conference		2	BOKU	2	
Intercultural competence – acting effectively in an international environment		2	BOKU	2	
Interdisciplinary concepts in understanding river-society inter-actions		2	BOKU	2	
Security training for studying and field research abroad – raising awareness for critical and emergency situations		2	BOKU	2	
Strategic management		2	BOKU	2	
Organisational behaviour and gender issues		2	BOKU	2	
Water resources management for sustainable agriculture		2	UNS	2	
Decision-making in Agriculture		2	UNS	2	
Agroecological Concepts in Sustainable Food Production		2	UNS	2	
Farm crops drying and storing		2	UNS	2	
Fruit and vegetable postharvest technology		2	UNS	2	
Plant nutrition in sustainable agriculture		2	UNS	2	
Crop ecophysiology		2	UNS	2	
Energy efficiency in agriculture		2	UNS	2	

Cover crops for soil conservation		2	UNS	2	
Sustainable Use of Soils		2	UNS	2	
Weather derivatives and risk management in agriculture: Theory and applications		2	UNS	2	
Agroecological Concepts in Sustainable Food Production		2	UNS	2	
Modern Farm Management		2	UNS	2	
Water resources management for sustainable agriculture		2	UNS	2	
Hydroecology		2	UNS	2	
Plant nutrition in sustainable agriculture		2	UNS	2	
Plant nutrition in sustainable agriculture		2	UNS	2	
Sustainable Use of Soils		2	UNS	2	
Constructed Wetlands in Protection of Water Resources		2	UNS	2	
Soil Resources		2	UNS	2	
Insects as food and feed		2	UNIZG	2	
Regional marketing		2	UNIZG	2	
e-marketing for sustainable development		2	UNIZG	2	
Food marketing and consumer behaviour		2	UNIZG	2	
Applied entomology		2	UNIZG	2	
Yield formation in arable crops		2	UNIZG	2	
Microbial enzymatic activities in soil		2	UNIZG	2	
Grassland Management		2	UNIZG	2	
Forage crops		2	UNIZG	2	
Field crops and bioenergy cropping systems		2	UNIZG	2	
Waste management in agriculture		2	UNIZG	2	
Natural enemies and principles of biological control		2	UNIZG	2	
Molecular methods in microbial agroecology		2	UNIZG	2	
Ichthyology		2	UNIZG	2	
Molecular diversity and evolution		2	UNIZG	2	
Plant ecophysiology		2	UNIZG	2	
Plant pest management		2	UNIZG	2	
Water Management in Agriculture		2	UNIZG	2	
Biogeochemistry of soil metals		2	UNIZG	2	
Global ecology		2	UNIZG	2	
Mineralogy and petrology		2	UNIZG	2	
Environmental risk analysis and management		2	UNIZG	2	
Aquatic ecosystems and biodiversity		2	UNIZG	2	
Limnology and Oceanology		2	UNIZG	2	
Geomorphology and landscape ecology		2	UNIZG	2	
Invasive arthropods		2	UNIZG	2	
Renewable Energy for Rural Areas		2	UNIZG	2	
Investments and investment projects in agribusiness		2	UNIZG	2	
Project Management and Projects at Agribusiness		2	UNIZG	2	
Strategic Management in Agribusiness		2	UNIZG	2	
Agri-environmental law and policy		2	UNIZG	2	
Financial management in agribusiness		2	UNIZG	2	

### State exam

Study program **N0811A370028 – Danube AgriFood Master (DAFM)**

according to the second year university



# Study program N0712A330002 – Natural Resources and Environment (ENVIM)

## MSc. full time course

Program guarantor: prof. Ing. Radka Kodešová, CSc.

### 1st year

	Subject	ECTS	WS	SS
AAA41E	Advanced Meteorology and Climatology	5	2/2 E	
AMA09E	Agricultural and Environmental Microbiology	5	2/2 E	
AEA17E	Agricultural Ecology	4	2/1 E	
ACA06E	Environmental Analytical Chemistry	5	2/2 E	
AGA47E	Experimental Design and Statistics	5	2/2 E	
AWA38Z	Start up module	1	0,7/0 C	
ZBX03E	Water Resources Management	5	2/2 E	
	1x Compulsory Optional Subject group 1	min 5.	WS or SS	
APA03Z	Excursion – Soils and Water Resources of the Czech Republic	3		3 days C
AWA64Z	MSc. Thesis I	5		125 hours C
AUA59Z	Practical Diploma Training	5		125 hours C
APA19E	Soil and Chemical Relationship	5		2/2 E
AHA17E	Soil and Plant Relationship	5		2/2 E
AIA04E	Soil and Water Relationship	5		2/2 E
APA22E	Soil Taxonomy, Survey and GIS	5		2/0 20s 4fp E
63 + optional subject (5) = <b>68 C</b>				

### 2nd year

	Subject	ECTS	WS	SS
EEA16E	Environmental Economics	5	2/1 E	
AIA05E	Hydrogeology	5	2/2 E	
APA17E	Modelling in Soil Science	5	2/2 E	
APA21E	Soil Conservation and Protection	5	2/2 E	
	2x Compulsory Optional Subject group 1	min. 10	WS or SS	
	2x Compulsory Optional Subject group 2	min. 10	WS or SS	
AWA63Z	MSc. Thesis II	6+6	150 hours C	150 hours C
APA23E	Proximal and Remote Sensing in Soil Science	4		2/1 zk
36 + optional subjects (20) = <b>56 C</b>				
in total 99 + optional subjects (25) = <b>124 C</b>				

### List of optional subjects ENVIM – group 1

	Compulsory optional subject	ECTS	WS	SS
APA14E	Environmental Soil Science	5	2/2 E	
ZBX27E	Water in Landscape	5	2/2 E	
AIA13E	Crop and Irrigation Systems Management	5	2/2 E	2/2 E
AIA08E	Hydrology	5	2/2 E	2/2 E
AIA10E	Hydrometeorology	5	2/2 E	2/2 E
ZVX24E	Hydroinformatics	5		2/2 E
AIA12E	Survey for Soil and Water Relationship	5		2/2 E

### List of optional subjects ENVIM – group 2

	Compulsory optional subject	ECTS	WS	SS
ACA12E	Biochemistry	5	2/2 E	
AHA39E	Environment Pollution and Remediation	5	2/2 E	
AOA28E	Fundamentals of Plant Protection	5	2/2 E	
AOA29E	General Phytopathology	5	2/2 E	
ATA17E	Management of Turf and Lawn	5	2/0,83 4s 4fp 6e E	
ACA11E	Advanced Organic Chemistry	5		2/2 E

Explanation: WS = Winter semester; SS = Spring semester; E = Examination; C = Credited, S = seminar, fp = field practice, e = excursion

The student should enrol in the Erasmus + program and should spend one semester abroad at one of our sister universities. If a student has an approved "Learning Agreement" (list of courses at a sister university) by Study Program guarantor then all fulfilled equivalent courses at a foreign university are accepted and he/she do not need to complete these courses from the curriculum here above.

### State exam

#### Study program N0712A330002 – Natural Resources and Environment (ENVIM)

Subject of the SE (corridor)	Subjects of the corridor
Soil and Environment	Soil and Chemical Relationship
	Soil Conservation and Protection
Water and Environment	Soil and Water Relationship
	Modeling in Soil Science
	Hydrogeology
Biosphere and Environment	Soil and Plant Relationship
	Agricultural and Environmental Microbiology
	Agricultural Ecology
Diploma thesis defence	

Study program N0712A370001 - **Natural Resources Management and Ecological Engineering (NARMEEM)**, 2nd year student, BOKU current stay  
**MSc. full time course**  
Program guarantor: prof. Ing. Pavel Tlustoš, CSc.

**1st year**

	Subject	ECTS	WS	SS
AAA41E	Advanced Meteorology and Climatology	5	2/2 E	
AMA09E	Agricultural and Environmental Microbiology	5	2/2 E	
AEA17E	Agricultural Ecology	4	2/1 E	
ACA06E	Environmental Analytical Chemistry	5	2/2 E	
AGA47E	Experimental Design and Statistics	5	2/2 E	
	At least 15 Credits from Compulsory optional subject I	min. 15	WS or SS	
AHA17E	Soil and Plant Relationship	5		2/2 E
AIA04E	Soil and Water Relationship	5		2/2 E
AIA04Z	Excursion	1		1 day C
AUA59Z	Practical Diploma Training	5		125 hours C
AWA64Z	MSc. Thesis I	5		125 hours C
46 + 15 C. optional subject = 61 Cr.				

**2nd year**

	Subject	ECTS	WS	SS
AHA39E	Environment Pollution and Remediation **	5	2/2 E	
	At least 15 Credits from Compulsory optional subject I	min. 15	WS or SS	
	At least 23 Credits from Compulsory optional subject II	min. 23	WS or SS	
AWA63Z	MSc. Thesis	6+6	150 hours C	150 hours C
APA19E	Soil and Chemical Relationship	5		2/2 E
AUA59Z	Practical Diploma Training *	5		20 days
22 + Compulsory optional subjects (min. 38 Cr.) in total 68 + optional subj. (min 53) = <b>121 C</b>				

\* if not studied in the first year

\*\* you may take two (911312+911344) or (912317+912313) or (812387+812388) equivalent items on the BOKU from this offer (min. 6 C):

		C
• 911312	Rhizosphere processes and application to agriculture and soil protection	3
• 911344	Ecology and management of the rhizosphere in ecological engineering	3
• 912317	Air pollution effects on forest ecosystems	3
• 912313	Forests and water	3
• 812387	Environmental impacts on riverine ecosystems I	4
• 812388	Environmental impacts on riverine ecosystems II	2

*You must study both subjects together*

**Study program N0712A370001 - Natural Resources Management and Ecological Engineering  
(NARMEEM)**

**MSc. full time course**

Program guarantor: prof. Ing. Pavel Tlustoš, CSc.

**From 2022/23**

**1st year - CZU**

	<b>Subject</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AAA41E	Advanced Meteorology and Climatology	5	2/2 E	
AMA09E	Agricultural and Environmental Microbiology	5	2/2 E	
AEA17E	Agricultural Ecology	4	2/1 E	
ACA06E	Environmental Analytical Chemistry	5	2/2 E	
AGA47E	Experimental Design and Statistics	5	2/2 E	
AWA38Z	Start up module	1	0,7/0 C	
	At least 5 Credits from Compulsory optional subject I	min. 5	WS or SS	
AHA39E	Environment Pollution and Remediation *	5		2/2 E
APA19E	Soil and Chemical Relationship	5		2/2 E
AHA17E	Soil and Plant Relationship	5		2/2 E
AIA04E	Soil and Water Relationship	5		2/2 E
AIA04Z	Excursion	1		1 day C
AUA59Z	Practical Diploma Training	5		125 hours C
AWA64Z	MSc. Thesis I	5		125 hours C
51 + 5 C. optional subject = 56 Cr.				

\* from 2023/24

**2nd year – BOKU/CZU**

	<b>Subject</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	At least 25 Credits from Compulsory optional subject I	min. 25	WS or SS	
	At least 22 Credits from Compulsory optional subject II	min. 22	WS or SS	
AWA63Z	MSc. Thesis	6+6	150 hours C	150 hours C
AUA59Z	Practical Diploma Training *	5		20 days
AHA39E	Environment Pollution and Remediation *	5		2/2 E
17 + Compulsory optional subjects (min. 47 Cr.)				
in total 68 + optional subj. (min 52) = <b>120 C</b>				

\* if not studied in the first year

## NARMEE courses

### List of compulsory optional subjects I - CZU

	<b>Soil Resources</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
APZ03E	Environmental Soil Science	5	2/2 E	
APA21E	Soil Conservation and Protection	5	2/2 E	
APA22E	Soil Taxonomy Survey and GIS	5		2/2 E
	<b>Water Resources and Climate</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AIA05E	Hydrogeology	5	2/2 E	
AEA62E	Aquaculture	5	2/2 E	
ZBX03E	Water Resources Management	5	2/2 E	
AIA08E	Hydrology	5	2/2 E	2/2 E
AIA13E	Crop and Irrigation Systems Management	5	2/2 E	2/2 E
AIA12E	Survey for Soil and Water Relationship	5		2/2 E
	<b>Bioresources</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
ABA26E	Environmental Physiology of Plant	5	2/2 E	

### List of compulsory optional subjects I - BOKU

	<b>Introduction</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
911353	Introduction in natural resources management and ecological engineering	3	x	
731324	Resource and environmental economics	3		x
911341	Biogeochemistry of soils	3		x
815340	Lecture series in soil, water and atmosphere	3	x	

	<b>Fundamentals of natural resources</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Soil resources</b>			
911300	Soil physics and chemistry	3	x	
911309	Soil chemistry laboratory	3	x	
833301	Soil ecology	3	x	
911321	Field course soil ecology	3	x	
911350	Soils of the world: genesis and classification	3		x
911304	Soil indicators	3		x
911346	Description, functions of soil structure and its changes in agricultural land use	3		x
911317	Soil properties and processes for ecological engineering	3		x
	<b>Water resources and climate</b>			
812342	Ecology of aquatic systems	3	x	
872330	Hydrogeology	3	x	
814301	Meteorological conditions and precipitation	3	x	
816356	Advanced topics on hydrology	3	x	
812340	Limnology	3	x	
812341	Limnochemistry and nutrient cycling	3	x	
812345	Physical environment of riverine landscape	2	x	
812353	River habitat and landscape assessment	4	x	

811357	Biology, chemistry and microbiology for civil engineering	3		x
819339	Sediment regime and river morphology	3		x
	<b>Bioresources, biodiversity and ecology</b>			
831304	Ecology and population biology of plants in agro-ecosystems	5	x	
833315	Farmland ecology	1	x	
812389	Population genetics and evolutionary theory relevant for the management and protection of aquatic organisms	3	-	-
834305	Conservation biogeography and genetics	3	x	
812343	Taxonomy and ecology of benthic invertebrates	3	x	
812344	Ecology of fishes	3	x	
812355	Fish sampling and monitoring	3	x	
812356	Fish ecological status assessment	3	x	
812357	Benthic invertebrate sampling and monitoring	3		x
812358	Benthic invertebrate status assessment	3		x
831339	Introduction to tropical ecology	2	-	-
951332	Crop production in the tropics and subtropics	4		x
772300	Biophysical chemistry	3		x
773310	Bioorganic chemistry	3		x
772311	Kinetics of biochemical reactions	3		x
772306	Proteomics	3		x
911354	Stable isotopes (C, N, S, O, H) in soil and environmental sciences	3	x	
815328	Isotope and tracer hydrology	3		x
	<b>Fundamentals of natural resource management</b>			
735318	Decision support systems	3	x	
913311	Multiple criteria decision making in natural resource management	3	x	
731335	Game theory in environmental and natural resource management	3	x	
731325	Principles of commodity markets and trade policy	3		x

### List of compulsory optional subjects II – CZU

	<b>Agro-municipal Resource Management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AOA29E	General Phytopathology	5	2/2 E	
ARA42E	Alternative Agriculture	5	2/2 E	
LHX17E	Forest Management	6	2/2 E	
LPX24E	Forest Management in Air Polluted Areas	6	2/2 E	
LLX01E	Forest Ecology	6	2/2 E	
LOX12E	Forest Protection	6		2/2 E
LPX20E	Silviculture	6		2/2 E

	<b>Ecological Engineering and Risk Management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
ZEX27E	Ecology and Ecological Methods	6	2/2 E	
ZUX14E	Landscape and Ecological Applications	6	2/2 E	
ZGX02E	GIS I	5	2/2 E	
ZEX01Z	Aquatic Ecosystem Restoration	6	2/2 C	
AZA36E	Landscaping	6		2/2 E
ZBX15E	Spatial Planning	6		2/2 E

	<b>Nature Conservation And Biodiversity Management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
ZEX01E	Biodiversity	6	2/1 E	
ZUX01E	Landscape Ecology	5	2/2 E	
LLX06E	Vegetation in Land Management	5	2/2 E	
AEA38E	Fish Systematics	5		2/2 E
AEA20E	Parasitology	5		2/2 E
ZOX05E	Paleoecology	3		1/0 E
ZEX09E	Conservation Biology	6		2/1 E
ZEX04E	Ecosystems Conservation and Management	6		2/2 E
LLX05E	Classification of Vegetation	6		2/2 E

	<b>Global Resources And Sustainability Management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
APA17E	Modeling in Soil Science	5	2/2 E	
ZBX09E	River Restoration	6	2/1 E	
ZEX10E	Conservation Policy	4		2/0 E
ZUX03E	Wetlands Cons. and Management	6		2/1 E

	<b>Human Dimension And Socio-Economic Aspects Of Sustainable Development</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
AQA25E	Food Quality and Food Safety	5	2/2 E	
AKA39E	Sensory Analysis of Food	4	1/2 E	
LRX07E	Forest Enterprise Economics	6		2/2 E
EHI03E	Rural Development	5		2/2 E
EJE21E	Law in EU	4		2/1 E

### List of compulsory optional subjects II – BOKU

	<b>Agro-municipal resource management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Soil management and protection</b>			
815321	Soil conservation and soil protection	3	x	
815320	Soil water management	3	x	
933308	Soil fertility and soil ecology in organic agriculture	3		x
911301	Soil protection	3		x
911307	Interdisciplinary project work: soil sciences	6	x	
911312	Rhizosphere processes and application to agriculture and soil protection	3	x	
911344	Ecology and management of the rhizosphere in ecological engineering	3	x	
	<b>Forest services and management</b>			
912317	Air pollution effects on forest ecosystems	3	x	
912313	Forests and water	3	x	
912328	Agroforestry in mountain regions	3		x
912332	Field camp II - concepts and methods of site ecology, forest growth and yield	3		x
916323	Field Camp I - introduction to mountain forestry and forest sciences	2	x	
913338	Natural resource management in mountain forests	4		x
	<b>Water resource planning and waste management</b>			

816338	Water resources planning and management	3	x	
815319	Irrigation design	3	x	
970306	Methods in environmental biotechnology	3		x
813303	Planning and assessment of waste management systems	3		x

	<b>Ecological engineering and risk management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Mitigation of natural hazards and erosion control</b>			
871324	Mountain hazard processes	6	x	
873320	Geotechnics	3		x
874300	Soil and water bioengineering - principles and applications	3		x
819301	Hydraulic engineering and river basin management	3	x	
819336	Integrated flood risk management	3	x	
819340	Ecologically oriented methods and monitoring in river engineering	3		x
816325	Flood forecasting and flood protection	3		x
871360	Risk management and vulnerability assessment	3	x	
871314	Protection and mitigation measures against natural hazards	3		x
	<b>Management and remediation of polluted soils and environments</b>			
911336	Soil pollution and remediation	3		x
911343	In-situ treatment of polluted soils and sediments: phytoremediation, in-situ fixation and attenuation techniques	3		x
	<b>River and river Landscape management and engineering</b>			
812347	Human impacts in riverine landscapes	2	x	
812349	Ecological river landscape management	2	x	
812350	Applications in river landscape management	2	x	x
	<b>Sanitary engineering and water pollution control</b>			
811334	Risk assessment in the aquatic environment	3	x	
811354	Case studies in sanitary engineering	3	x	
811362	On site solutions for water supply and sanitation	3	x	
811358	Planning and design in water supply and wastewater treatment	3		x

	<b>Nature conservation and biodiversity management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Biodiversity and conservation in aquatic, semiterrestrial and terrestrial environments</b>			
812387	Environmental impacts on riverine ecosystems I	4	x	
812388	Environmental impacts on riverine ecosystems II	2	x	
812377	Fisheries management and conservation	2		x
812384	Aquatic biomonitoring and -assessment	2	x	



812354	Ecohydromorphological mapping	2	x	
812360	Ecology, restoration and conservation of aquatic and riparian vegetation	2		x
912337	Biodiversity and conservation of mountain forests	2		x
913327	Fire management in mountain forest ecosystems - prophylaxis and control	2		x
916326	Management and forest protection in high altitude afforestations and protective forests	3		x
912330	Mountain forest dynamics and fire ecology	3		x
933302	Protection of natural resources by organic farming	3	x	
834321	Biocultural diversity in rural landscapes	3		x

	<b>Global resources and sustainability management</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Global aspects of land and soil resource management</b>			
911342	Soils and food security	2	x	
911327	Soils and global change	4	x	
911347	Soil problems in aridic and semiaridic regions	3		x
911324	Soil management in tropical and subtropical developing regions	3		x
857316	International land management	1,5	x	
854331	International land management	4,5		x
	<b>Global aspects of water and forest resource management and climate change mitigation</b>			
816342	Possible impacts of climate change on water resources	3		x
814308	Interdisciplinary seminar on agriculture, climate change and transition	3	x	
811332	Water resources management in developing cooperation	3		x
811308	Appropriate technologies for water supply & sanitation in developing countries	3		x
732337	Innovations for sustainable forest management	4	x	
913324	Adapting forest management to climate change	2	x	
	<b>Global aspects of waste management</b>			
818306	Radioactive waste management – its perception and acceptance I	2	x	
818307	Radioactive waste management – its perception and acceptance II	2		x
813304	Life cycle management 2	2		x
813300	Global waste management I	3	x	
813301	Global waste management II	3		x
	<b>Global aspects of renewable energy resources</b>			
893311	Renewable energy resources	3	x	
818308	Technology assessment and risk management considering wind power plants	3	x	

	<b>Human dimension and socio-economic aspects of sustainable development</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
	<b>Environmental policy, forecast and networking</b>			
732326	Institutions and policies of the EU	3	-	-

	(Introduction to the law and politics of the European Union)			
812348	Water legislation	2	x	
816361	Cooperation development	1	x	
735322	Global networking	6		x
731347	Rural development	3		x
731395	Introduction to development cooperation	3		x
812348	Water legislation	2	x	
730306	Foresights - what future to expect? (Late lessons from early warnings)	2	x	
736322	Governance of emerging technologies	2	-	-
812318	Environmental history of river systems	3	x	
812327	Interdisciplinary concepts in understanding river-society interactions	3		x
	<b>Sustainable development, development research and innovation</b>			
934305	Facilitating change for sustainable development	3		x
934317	Participatory methods in development research and practice	3		x
731330	Growth, development, trade and environment	3		x
852319	Science and technology studies: Understanding sustainable innovation	3		x
934302	Applied development research I	3	x	
934303	Applied development research II	3		x
934306	Negotiating Change: simulating an international conference for sustainable development	3	x	
934307	Development innovation	3	x	

	<b>General Skills &amp; Research Methods</b>	<b>ECTS</b>	<b>WS</b>	<b>SS</b>
857321	Remote sensing and GIS in natural resource management	3	x	
857320	Remote sensing and GIS in natural resource management	3	x	
857304	Remote sensing and image processing	6		x
851311	Environmental statistics	3		x
851320	Statistics of extreme events and geostatistics	3	x	
816355	Uncertainties in hydrological and ecosystem modelling	3	x	
851311	Environmental statistics	3		x
816334	Hydrological processes and modelling	3	x	
815311	Simulation in vadose zone environment	3	x	
731351	Applied mathematical programming in natural resource management	3	x	
731369	Computer simulation in energy and resource economics	3	x	
819332	Computer based river modelling	3	x	
815335	Using water erosion models	3	x	
731348	Managerial economics	3	x	
731328	Valuation methods for natural resources	3		x
735336	Intercultural Communication	3		x
731383	Principles of empirical research methods in the social sciences	3		x
915344	Technology assessment	3	x	
915327	Project management	3		x

	Language	ECTS	WS	SS
ELX..Z	Foreign Language	2	0/2 C	
ELX..E	Foreign Language	3		0/2 E
	BOKU ...			

The student should enrol in the Erasmus + program and should spend one semester abroad at one of our sister universities. If a student has an approved "Learning Agreement" (list of courses at a sister university) by Study Program guarantor then all fulfilled equivalent courses at a foreign university are accepted and he/she do not need to complete these courses from the curriculum here above.

### State exam

Study program **N0712A370001 – Natural Resources Management and Ecological Engineering (NARMEEM)**

Subject of the SE (corridor)	Subjects of the corridor
Soil Properties and Conservation	Soil and Chemical Relationship
	Soil Conservation and Protection or equivalent
Water Resources and Management	Soil and Water Relationship
	Water Resources Management or equivalent
Atmosphere, Biosphere and Environment	Advanced Meteorology and Climatology
	Soil and Plant Relationship
	Agricultural Ecology
	Environment Pollution and Remediation
Diploma thesis defence	