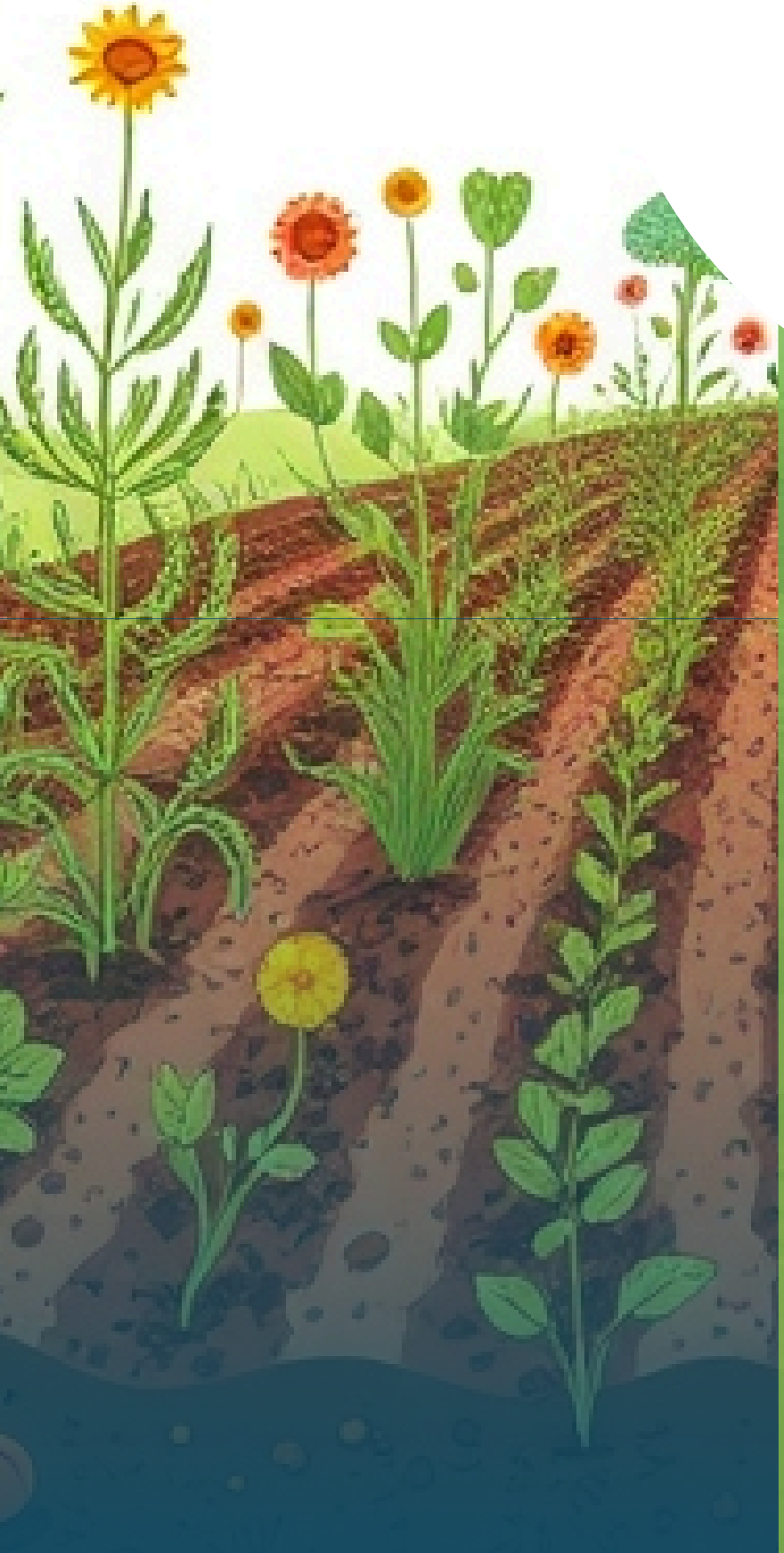
IMPLEMENTATION PLAN



2022./2023.

Specialist studies
Faculty of Agrobiotehnical Sciences Osijek

Josip Juraj Strossmayer University of Osijek
Faculty of Agrobiotechnical Sciences Osijek

Postgraduate specialist study QUALITY AND SAFETY OF ANIMAL PRODUCTS
Head of studies: Assoc. Prof. Ph.D. sc. Ivona Djurkin Kušec
Secretary of Studies: Assoc. Prof. Ph.D. sc. Nikola Raguž
2022/2023

Module coordinator	Name of the module	Mandatory/opti	ECTS	Student workload	Type of teaching	Number of hours	Teacher
Prof. dr. sc. Liljana Primorac	Selected Topics in Food Analysis	M	5	25	Lectures	20	Prof. dr. sc. Liljana Primorac
					Seminars	-	
					Exercises	5	Assoc. prof. Ph.D. sc. Ivana Flanjak
Prof. Ph.D. sc. Gabriella Kanizai Saric	Food Microbiology	M	5	25	Lectures	5	Prof. dr. sc. Gabriella Kanizai Saric
					Seminars	15	Prof. Ph.D. sc. Gabriella Kanizai Saric
					Exercises	5	Prof. Ph.D. sc. Gabriella Kanizai Saric
Prof. Ph.D. sc. Goran Kušec	Quality and Safety of Animal Products	M	10	50	Lectures	25	Prof. Ph.D. sc. Goran Kušec
					Seminars	10	Prof. Ph.D. sc. Goran Kušec
					Exercises	15	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
Assoc. prof. Ph.D. sc. Mislav Đidara	Hygiene and Sanitation in Production of Food of Animal Origin	M	10	50	Lectures	40	Assoc. prof. Ph.D. sc. Mislav Đidara
					Seminars	-	
					Exercises	10	Assoc. prof. Ph.D. sc. Mislav Đidara
Prof. Ph.D. sc. Goran Kušec	Regulations in Production and Transport of Animal Products	O	5	25	Lectures	15	Prof. Ph.D. sc. Goran Kušec
					Seminars	10	Prof. Ph.D. sc. Goran Kušec
					Exercises	-	
Prof. Ph.D. sc. Goran Kušec	Raw Materials of Animal Origin	O	5	25	Lectures	15	Prof. Ph.D. sc. Goran Kušec
					Seminars	10	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec

					Exercises	-	
Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec	Assessment of Quality and Evaluation of Animal Products (Meat and Milk)	0	5	25	Lectures	15	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
					Seminars	-	
					Exercises	10	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
Prof. Ph.D. sc. Gordana Kralik, prof. emer .	Production Systems in Animal Science	0	5	25	Lectures	5	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
						5	Prof. Ph.D. sc. Pero Mijić
						5	Prof. Ph.D. sc. Zvonko Antunović
						5	Prof. Ph.D. sc. Mirjana Baban
					Seminars	5	Prof. Ph.D. sc. Gordana Kralik, prof. emer .
					Exercises	-	
Prof. Ph.D. sc. Gordana Kralik, prof. emer .	Alternative Productions in Animal Science	0	5	25	Lectures	10	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
						5	Prof. Ph.D. sc. Pero Mijić
						5	Prof. Ph.D. sc. Zvonko Antunović
					Seminars	2	Prof. Ph.D. sc. Pero Mijić
						3	Prof. Ph.D. sc. Zvonko Antunović
					Exercises	-	
Prof. Ph.D. sc. Gordana Kralik, prof. emer .	Performing Experiments and Analysing Data	0	5	25	Lectures	15	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Zoran Skrtić
						5	Prof. Ph.D. sc. Zlata Kralik
Prof. Ph.D. sc. Zoran Skrtić	Animal Products for Special Purposes	0	5	25	Lectures	10	Prof. Ph.D. sc. Zoran Skrtić
						5	Prof. Ph.D. sc. Gordana Kralik, prof. emer .
					Seminars	10	Prof. Ph.D. sc. Goran Kušec
					Exercises	-	
Prof. Ph.D. sc. Zdravko Tolušić	The Market of Animal Products	0	5	25	Lectures	15	Prof. Ph.D. sc. Zdravko Tolušić
					Seminars	5	Prof. Ph.D. sc. Zdravko Tolušić
						5	Prof. Ph.D. sc. Igor Kralik

					Exercises	-	
Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec	Molecular Methods in Zootechnics	O	5	25	Lectures	20	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
					Seminars	5	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
					Exercises	-	
Prof. Ph.D. sc. Zlata Kralik	Production and Quality of Table Eggs	O	5	25	Lectures	20	Prof. Ph.D. sc. Zlata Kralik
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Zlata Kralik
	Specialist work	M	30		Lectures		
					Seminars		
					Exercises		

Postgraduate specialist study PRODUCTION SYSTEMS IN LIVESTOCK BREEDING

Head of studies: prof. Ph.D. sc. Zoran Skrtić

Secretary of Studies: Assoc. Prof. Ph.D. sc. Zlata Kralik

2022/2023

Module coordinator	Name of the module	Mandatory/optional	ECTS	Student workload	Type of teaching	Number of hours	Teacher
Assoc. prof. Ph.D. sc. Mislav Đidara	Physiology – selected chapters	M	9	60	Lectures	30	Assoc. prof. Ph.D. sc. Mislav Đidara
					Seminars	30	Assoc. prof. Ph.D. sc. Mislav Đidara
					Exercises	-	
Prof. Ph.D. sc. Gordana Kralik, Prof. Emer.	Performing Experiments and Processing Results	M	5	30	Lectures	20	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Zoran Skrtić
						5	Prof. Ph.D. sc. Zlata Kralik
Assoc. prof. Ph.D. sc. Dalida Galović	Principles of Breeding Domestic Animals	M	9	60	Lectures	40	Assoc. prof. Ph.D. sc. Dalida Galović
					Seminars	10	Prof. Ph.D. sc. Zoran Skrtić
					Exercises	10	Assoc. prof. Ph.D. sc. Vladimir Margeta
Prof. Ph.D. sc. Gordana Kralik, Prof. Emer.	Production of Monogastric Animals	O	9	60	Lectures	40	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
					Seminars	10	Prof. Ph.D. sc. Gordana Kralik, prof. emer .
					Exercises	5	Prof. Ph.D. sc. Zlata Kralik
						5	Assoc. prof. Ph.D. sc. Vladimir Margeta

Prof. Ph.D. sc. Zvonko Antunović	Poligrastic Animals Production	O	9	60	Lectures	25	Prof. Ph.D. sc. Zvonko Antunović
						15	Prof. Ph.D. sc. Pero Mijić
					Seminars	8	Prof. Ph.D. sc. Zvonko Antunović
						7	Prof. Ph.D. sc. Pero Mijić
					Exercises	5	Assoc. prof. Ph.D. sc. Dalida Galović
Prof. Ph.D. sc. Anđelko Opačak	Farming of Warm Water Fish	O	9	60	Lectures	40	Prof. Ph.D. sc. Anđelko Opačak
					Seminars	15	Assoc. prof. Ph.D. sc. Dinko Jelkic
					Exercises	5	Assoc. prof. Ph.D. sc. Dinko Jelkic
Assoc. prof. Ph.D. sc. Mislav Đidara	Hygiene and Sanitation in Animal Science	O	5	30	Lectures	20	Assoc. prof. Ph.D. sc. Mislav Đidara
					Seminars	-	
					Exercises	10	Assoc. prof. Ph.D. sc. Mislav Đidara
Prof. Ph.D. sc. Gordana Kralik, Prof. Emer.	Alternative Productions in Animal Science	O	5	30	Lectures	10	Prof. Ph.D. sc. Gordana Kralik, prof. emer.
						5	Prof. Ph.D. sc. Zvonko Antunović
						5	Prof. Ph.D. sc. Pero Mijić
					Seminars	5	Prof. Ph.D. sc. Zvonko Antunović
						5	Prof. Ph.D. sc. Pero Mijić
					Exercises	-	
Prof. Ph.D. sc. Zoran Skrtić	Animal Products for Special Purposes	O	5	30	Lectures	12	Prof. Ph.D. sc. Zoran Skrtić
						8	Prof. Ph.D. sc. Gordana Kralik, prof. emer .
					Seminars	5	Prof. Ph.D. sc. Goran Kušec
					Exercises	5	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
Prof. Ph.D. sc. Goran Kušec	Quality of Animal Products	O	9	60	Lectures	40	Prof. Ph.D. sc. Goran Kušec
					Seminars	10	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
					Exercises	10	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec
Prof. Ph.D. sc. Goran Kušec	Regulations in Livestock Production	O	5	30	Lectures	20	Prof. Ph.D. sc. Goran Kušec.
					Seminars	10	Assoc. prof. Ph.D. sc. Ivona Djurkin Kušec

Assoc. prof. Ph.D. sc. Nikola Raguž	Genetics of Quantitative Traits	O	5	30	Lectures	5	Assoc. prof. Ph.D. sc. Nikola Raguž
					Lectures	5	Prof. Ph.D. sc. Vesna Gantner
					Seminars	5	Assoc. prof. Ph.D. sc. Nikola Raguž
					Seminars	5	Prof. Ph.D. sc. Vesna Gantner
					Exercises	10	Assoc. prof. Ph.D. sc. Boris Lukic
Prof. Ph.D. sc. Igor Kralik	Market of Animal products	O	5	30	Lectures	20	Prof. Ph.D. sc. Igor Kralik
					Seminars	10	Prof. Ph.D. sc. Zdravko Tolušić
	Specialist work	M	30		Lectures		
					Seminars		
					Exercises		

Postgraduate specialist study PIG FARMING

Head of studies: Assoc. Ph.D. sc. Danijela Samac

Secretary of studies: Assoc. Prof. Ph.D. sc. Josip Novoseelec

2022/2023

Module coordinator	Name of the module	Mandatory/optional	ECTS	Student workload	Type of teaching	Number of hours	Teacher
Assoc. prof. Ph.D. sc. Mislav Đidara	Specificity of Swine Physiology and Porcine Reproduction	M	10	30	Lectures	20	Assoc. prof. Ph.D. sc. Mislav Đidara
					Seminars	10	Assoc. prof. Ph.D. sc. Mislav Đidara
					Exercises	-	
Assoc. Ph.D. sc. Danijela Samac	Genetics and Biometrics in Pig Production	M	10	60	Lectures	10	Assoc. Ph.D. sc. Danijela Samac
						10	Assoc. Ph.D. sc. Danijela Samac
						10	Prof. Ph.D. sc. Pero Mijić
					Seminars	15	Asst. Ph.D. sc. Danijela Samac
					Exercises	15	Asst. Ph.D. sc. Danijela Samac
Prof. Ph.D. sc. Matija Domaćinović	Feeding of Pigs	M	10	30	Lectures	20	Prof. Ph.D. sc. Matija Domaćinović
					Seminars	-	
					Exercises	10	Prof. Ph.D. sc. Zvonimir Steiner
Prof. Ph.D. sc. Davor Kralik	Pig Housing	O	10	30	Lectures	10	Prof. Ph.D. sc. Davor Kralik
						10	Prof. Ph.D. sc. Davor Kralik
					Seminars	5	Prof. Ph.D. sc. Davor Kralik
					Exercises	5	Prof. Ph.D. sc. Davor Kralik

Prof. Ph.D. sc. Zeljko Cvetnic	Health Care of Pigs	O	10	30	Lectures	25	Prof. Ph.D. sc. Zeljko Cvetnic
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Zeljko Cvetnic
Prof. Ph.D. sc. Davor Kralik	Waste Management in Pig Breeding	O	10	30	Lectures	10	Prof. Ph.D. sc. Davor Kralik
						5	Prof. Ph.D. sc. Davor Kralik
					Seminars	5	Prof. Ph.D. sc. Davor Kralik
					Exercises	10	Prof. Ph.D. sc. Davor Kralik
D oc. Ph.D. sc. Danijela Samac	Organic Pig Breeding	O	10	30	Lectures	5	Assoc. Ph.D. sc. Danijela Samac
						5	Assoc. prof. Ph.D. sc. Josip Novoseelec
						10	Prof. Ph.D. sc. Zvonko Antunović
					Seminars	5	Assoc. Ph.D. sc. Danijela Samac
						5	Prof. Ph.D. sc. Zvonko Antunović
					Exercises	-	
	Specialist work	M	30		Lectures		
					Seminars		
					Exercises		

Postgraduate specialist study FARM MANAGEMENT

Head of studies: prof. Ph.D. sc. Jadranka Deže

Secretary of studies: prof. Ph.D. sc. Tihana Sudarić

2022/2023

Module coordinator	Name of the module	Mandatory/optional	ECTS	Student workload	Type of teaching	Number of hours	Teacher
Prof. Ph.D. sc. Krunoslav Zmaic	Economics of Agricultural Resources	M	7	50	Lectures	25	Prof. Ph.D. sc. Krunoslav Zmaic
						10	Prof. Ph.D. sc. Tihana Sudarić
					Seminars	5	Prof. Ph.D. sc. Krunoslav Zmaic
						10	Prof. Ph.D. sc. Tihana Sudarić
					Exercises	-	
Prof. Ph.D. sc. Jadranka Deže	Management Strategies for Small and Medium Farms	M	8	55	Lectures	35	Prof. Ph.D. sc. Jadranka Deže
					Seminars	20	Prof. Ph.D. sc. Jadranka Deže
					Exercises	-	
Prof. Ph.D. sc. Ljubica Ranogajec	Planning and Projecting on Agricultural Economy	M	8	55	Lectures	35	Prof. Ph.D. sc. Ljubica Ranogajec
					Seminars	10	Prof. Ph.D. sc. Ljubica Ranogajec
					Exercises	10	Prof. Ph.D. sc. Ljubica Ranogajec
Prof. Ph.D. sc. Zdravko Tolušić	Agroindustrial Marketing	M	7	50	Lectures	15	Prof. Ph.D. sc. Zdravko Tolušić
						15	Prof. Ph.D. sc. Ruzica Lončarić
					Seminars	10	Prof. Ph.D. sc. Zdravko Tolušić
						10	Prof. Ph.D. sc. Ruzica Lončarić
					Exercises	-	
Prof. Ph.D. sc. Pero Mijić		O	5	45	Lectures	20	Prof. Ph.D. sc. Pero Mijić

	Introduction to Scientific Work				Seminars	25	Prof. Ph.D. sc. Pero Mijić
					Exercises	-	
Prof. Ph.D. sc. Tihana Sudarić	Policy of Agrarian Structure	0	5	45	Lectures	20	Prof. Ph.D. sc. Tihana Sudarić
						10	Prof. Ph.D. sc. Krunoslav Zmaic
					Seminars	10	Prof. Ph.D. sc. Tihana Sudarić
						5	Prof. Ph.D. sc. Krunoslav Zmaic
					Exercises	-	
Assoc. prof. Ph.D. sc. Snjezana Tolić	Regional Importance of Agricultural Production	0	5	45	Lectures	20	Assoc. prof. Ph.D. sc. Snjezana Tolić
					Seminars	25	Assoc. prof. Ph.D. sc. Snjezana Tolić
					Exercises	-	
Prof. Ph.D. sc. Igor Kralik	Quantitative Methods for Economic Analysis	0	5	45	Lectures	20	Prof. Ph.D. sc. Igor Kralik
					Seminars	25	Prof. Ph.D. sc. Igor Kralik
					Exercises	-	
Prof. Ph.D. sc. Tihana Sudarić	Competitiveness of the National Economy	0	5	45	Lectures	20	Prof. Ph.D. sc. Tihana Sudarić
						10	Prof. Ph.D. sc. Krunoslav Zmaic
					Seminars	10	Prof. Ph.D. sc. Tihana Sudarić
						5	Prof. Ph.D. sc. Krunoslav Zmaic
					Exercises	-	
Prof. Ph.D. sc. Davorin Turkalj	Information Systems in Agriculture	0	5	45	Lectures	30	Prof. Ph.D. sc. Davorin Turkalj
					Seminars	15	Prof. Ph.D. sc. Davorin Turkalj
					Exercises	-	
Prof. Ph.D. sc. Jadranka Deže	Entrepreneurship and Entrepreneurial Skills	0	5	45	Lectures	30	Prof. Ph.D. sc. Jadranka Deže
					Seminars	15	Prof. Ph.D. sc. Jadranka Deže
					Exercises	-	
Prof. Ph.D. sc. Rose Potter	Agromarketing Management	0	5	45	Lectures	15	Prof. Ph.D. sc. Ruzica Lončarić
						15	Prof. Ph.D. sc. Zdravko Tolušić
					Seminars	5	Prof. Ph.D. sc. Ruzica Lončarić
						10	Prof. Ph.D. sc. Zdravko Tolušić
					Exercises	-	

Prof. Ph.D. sc. Davorin Turkalj	Organizational Behavior in Agriculture	O	5	45	Lectures	25	Prof. Ph.D. sc. Davorin Turkalj
					Seminars	20	Prof. Ph.D. sc. Davorin Turkalj
					Exercises	-	
Prof. Ph.D. sc. Jadranka Deže	Human Resource Management	O	5	45	Lectures	25	Prof. Ph.D. sc. Jadranka Deže
					Seminars	20	Prof. Ph.D. sc. Jadranka Deže
					Exercises	-	
Prof. Ph.D. sc. Ivan Štefanić	Financial Management in Agriculture	O	5	45	Lectures	25	Prof. Ph.D. sc. Ivan Štefanić
					Seminars	20	Prof. Ph.D. sc. Ivan Štefanić
					Exercises	-	
Prof. Ph.D. sc. Ljubica Ranogajec	Cost management	O	5	45	Lectures	25	Prof. Ph.D. sc. Ljubica Ranogajec
					Seminars	20	Prof. Ph.D. sc. Ljubica Ranogajec
					Exercises	-	
Prof. Ph.D. sc. Zdravko Tolušić	Principles of agricultural economics	O	5	75	Lectures	50	Prof. Ph.D. sc. Zdravko Tolušić
					Seminars	25	Prof. Ph.D. sc. Igor Kralik
					Exercises	-	
Prof. Ph.D. sc. Ljubica Ranogajec	Organization and costs of agricultural production	O	5	75	Lectures	40	Prof. Ph.D. sc. Ljubica Ranogajec
					Seminars	15	Prof. Ph.D. sc. Ljubica Ranogajec
	Specialist work	M	20		Lectures		
					Seminars		
					Exercises		

Postgraduate specialist study in PLANT PROTECTION

Head of studies: prof. Ph.D. sc. Jasenka Cosic

Secretary of studies: prof. Ph.D. sc. Karolina Vrandečić

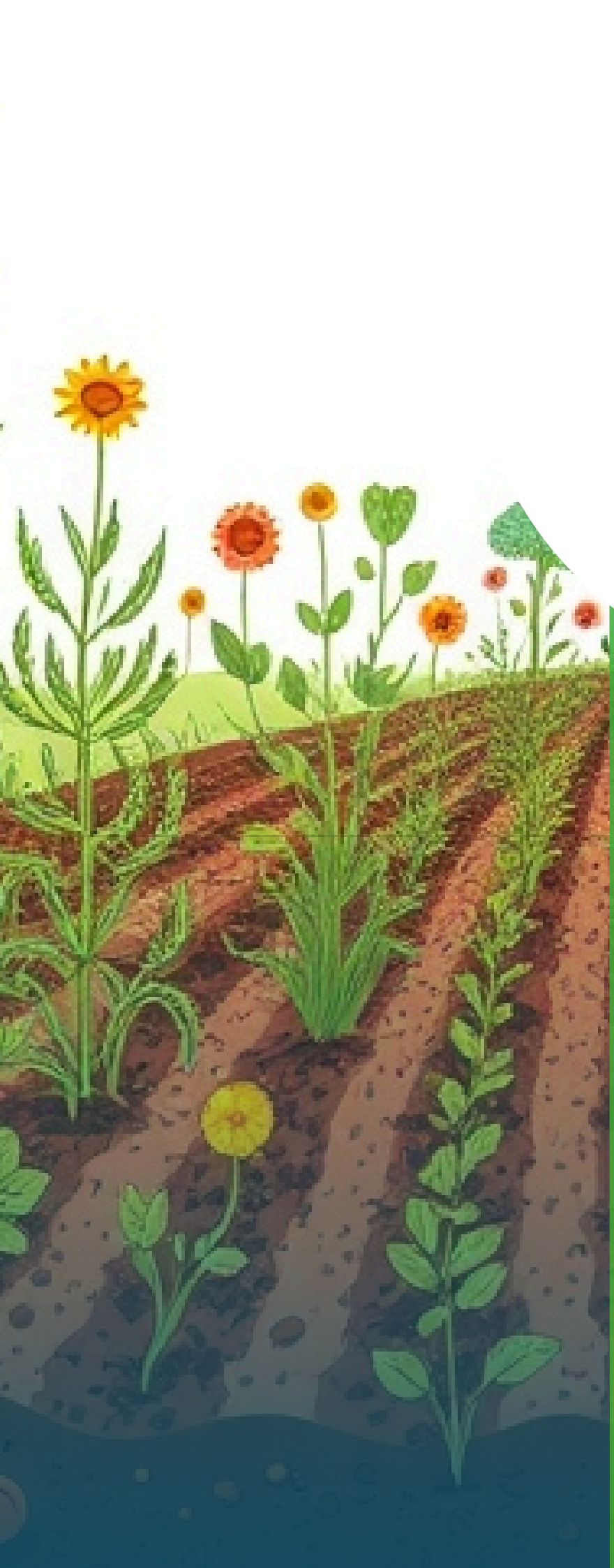
2022/2023

Module coordinator	Name of the module	Mandatory/optional	ECTS	Student workload	Type of teaching	Number of hours	Teacher
Prof. Ph.D. sc. Jasenka Cosic	Pest Ecology in Cultivated Plants	M	10	39	Lectures	10	Prof. Ph.D. sc. Jasenka Cosic
						10	Prof. Ph.D. sc. Mirjana Brmež
						10	Prof. Ph.D. sc. Edita Štefanić
					Seminars	3	Prof. Ph.D. sc. Jasenka Cosic
						3	Prof. Ph.D. sc. Mirjana Brmež
						3	Prof. Ph.D. sc. Edita Štefanić
					Exercises	-	
Prof. Ph.D. sc. Renata Baličević	Integrated Pest Management	M	10	35	Lectures	20	Prof. Ph.D. sc. Renata Baličević
					Seminars	10	Asst. Ph.D. sc. Marija Ravlić
					Exercises	5	Asst. Ph.D. sc. Marija Ravlić
Prof. Ph.D. sc. Ivana Majić	Acarology	O	6	20	Lectures	10	Prof. Ph.D. sc. Ivana Majić
					Seminars	5	Prof. Ph.D. sc. Anita Liška
					Exercises	5	Prof. Ph.D. sc. Ivana Majić
Prof. Ph.D. sc. Mirjana Brmež	Quarantine Pests	O	5	15	Lectures	10	Prof. Ph.D. sc. Mirjana Brmež
					Seminars	5	Prof. Ph.D. sc. Mirjana Brmež
					Exercises	-	
Prof. Ph.D. sc. Mirjana Brmež	Nematology	O	6	30	Lectures	15	Prof. Ph.D. sc. Mirjana Brmež
					Seminars	-	

					Exercises	15	Prof. Ph.D. sc. Mirjana Brmež
Prof. Ph.D. sc. Ivana Majić	Pests of Field Crops	0	6	20	Lectures	10	Prof. Ph.D. sc. Ivana Majić
					Seminars	5	Prof. Ph.D. sc. Ivana Majić
					Exercises	5	Prof. Ph.D. sc. Ivana Majić
Prof. Ph.D. sc. Ivana Majić	Insect Systematic	0	6	20	Lectures	5	Prof. Ph.D. sc. Ivana Majić
					Seminars	5	Prof. Ph.D. sc. Ivana Majić
					Exercises	10	Prof. Ph.D. sc. Ivana Majić
Prof. Ph.D. sc. Anita Liška	Stored Product Pests and Their Control	0	6	20	Lectures	10	Prof. Ph.D. sc. Vlatka Rozman
					Seminars	5	Prof. Ph.D. sc. Anita Liška
					Exercises	5	Prof. Ph.D. sc. Vlatka Rozman
Prof. Ph.D. sc. Mirjana Brmež	Pests of Fruit Trees and Grape Vines	0	6	20	Lectures	10	Prof. Ph.D. sc. Mirjana Brmež
					Seminars	5	Prof. Ph.D. sc. Mirjana Brmež
					Exercises	5	Prof. Ph.D. sc. Mirjana Brmež
Asst. Ph.D. sc. Ankica Sarajlić	Insect Pests in Horticulture	0	6	20	Lectures	15	Asst. Ph.D. sc. Ankica Sarajlić
					Seminars	5	Asst. Ph.D. sc. Ankica Sarajlić
					Exercises	-	
Prof. Ph.D. sc. Enrih Merdic	Urban entomology	0	3	15	Lectures	15	Prof. Ph.D. sc. Enrih Merdic
					Seminars	-	
					Exercises	-	
Asst. Ph.D. sc. Ankica Sarajlić	Pests of Vegetables	0	6	20	Lectures	10	Asst. Ph.D. sc. Ankica Sarajlić
					Seminars	5	Asst. Ph.D. sc. Ankica Sarajlić
					Exercises	5	Asst. Ph.D. sc. Ankica Sarajlić
Prof. Ph.D. sc. Jasenka Cosic	Diseases of Ornamental Plants	0	6	20	Lectures	10	Prof. Ph.D. sc. Jasenka Cosic
					Seminars	5	Prof. Ph.D. sc. Jasenka Cosic
					Exercises	5	Prof. Ph.D. sc. Jasenka Cosic
Prof. Ph.D. sc. Karolina Vrandečić	Seed Diseases	0	6	20	Lectures	7	Prof. Ph.D. sc. Karolina Vrandečić
						5	Prof. Ph.D. sc. Jasenka Cosic
					Seminars	3	Prof. Ph.D. sc. Karolina Vrandečić
						5	Prof. Ph.D. sc. Jasenka Cosic

					Exercises	5	Prof. Ph.D. sc. Karolina Vrandečić
Prof. Ph.D. sc. Karolina Vrandečić	Diseases of Tree Fruits and Grapevine	0	6	20	Lectures	10	Prof. Ph.D. sc. Karolina Vrandečić
					Seminars	5	Prof. Ph.D. sc. Karolina Vrandečić
					Exercises	5	Prof. Ph.D. sc. Karolina Vrandečić
Prof. Ph.D. sc. Suzana Kristek	Ecological Microbiology	0	6	20	Lectures	10	Prof. Ph.D. sc. Suzana Kristek
					Seminars	5	Prof. Ph.D. sc. Suzana Kristek
					Exercises	5	Prof. Ph.D. sc. Suzana Kristek
Prof. Ph.D. sc. Jasenka Cosic	Anatomy and Physiology of Infected Plants	0	5	15	Lectures	10	Prof. Ph.D. sc. Jasenka Cosic
					Seminars	5	Prof. Ph.D. sc. Karolina Vrandečić
					Exercises	-	
Prof. Ph.D. sc. Jasenka Cosic	Laboratory Methods in Mycology	0	4	20	Lectures	-	
					Seminars	-	
					Exercises	15	Prof. Ph.D. sc. Jasenka Cosic
						5	Prof. Ph.D. sc. Karolina Vrandečić
Prof. Ph.D. sc. Jasenka Cosic	Arable Crop Diseases	0	6	20	Lectures	10	Prof. Ph.D. sc. Jasenka Cosic
					Seminars	5	Prof. Ph.D. sc. Karolina Vrandečić
					Exercises	5	Prof. Ph.D. sc. Karolina Vrandečić
Prof. Ph.D. sc. Jasenka Cosic	Vegetable Diseases	0	6	20	Lectures	10	Prof. Ph.D. sc. Jasenka Cosic
					Seminars	10	Prof. Ph.D. sc. Jasenka Cosic
					Exercises	5	Prof. Ph.D. sc. Karolina Vrandečić
Prof. Ph.D. sc. Edita Štefanić	Monitoring and Management of Allergenic Plants	0	5	25	Lectures	15	Prof. Ph.D. sc. Edita Štefanić
					Seminars	-	
					Exercises	10	Prof. Ph.D. sc. Edita Štefanić
Prof. Ph.D. sc. Renata Baličević	Pesticide Application and Legislation	0	6	20	Lectures	10	Prof. Ph.D. sc. Renata Baličević

					Seminars	10	Prof. Ph.D. sc. Renata Baličević
					Exercises	-	
Prof. Ph.D. sc. Edita Štefanić	Weed Communities in Agriculture	O	6	20	Lectures	10	Prof. Ph.D. sc. Edita Štefanić
					Seminars	5	Prof. Ph.D. sc. Edita Štefanić
					Exercises	5	Prof. Ph.D. sc. Edita Štefanić
Prof. Ph.D. sc. Renata Baličević	Plant Protection Program Design	O	4	20	Lectures	15	Prof. Ph.D. sc. Renata Baličević
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Renata Baličević
Asst. Ph.D. sc. Marija Ravlić	Plant Protection in Protected Areas	O	4	20	Lectures	15	Asst. Ph.D. sc. Marija Ravlić
					Seminars	-	
					Exercises	5	Asst. Ph.D. sc. Marija Ravlić
Prof. Ph.D. sc. Edita Štefanić	Weed Control Economics	O	3	15	Lectures	5	Prof. Ph.D. sc. Edita Štefanić
					Lectures	5	Assoc. prof. Ph.D. sc. Sanda Rašić
					Seminars	-	
					Exercises	5	Prof. Ph.D. sc. Ivan Štefanić
	Specialist work	M	30		Lectures		
					Seminars		
					Exercises		



LEARNING OUTCOMES

2022./2023.

SPECIALIST STUDIES
FACULTY OF AGROBIOTEHNICAL SCIENCES OSIJEK

Josip Juraj Strossmayer University of Osijek
Faculty of Agrobiotechnical Sciences Osijek

CONTENT

INTRODUCTION

The Faculty of Agrobiotechnical Sciences in Osijek has developed and has been offering for many years five university specialist programs based on agricultural knowledge in various fields.

The university specialist programs Quality and Safety of Animal Products, Production Systems in Livestock Farming, and Pig Farming provide expertise in areas such as animal husbandry, domestic animal nutrition, genetics, and the breeding of plants, animals, and microorganisms. Meanwhile, the university specialist program Agricultural Management offers knowledge in agricultural economics, and the program Plant Protection focuses on phytomedicine.

The Quality and Safety of Animal Products, Production Systems in Livestock Farming, Pig Farming, and Agricultural Management programs last three semesters (1.5 years), awarding 90 ECTS credits upon completion. The Plant Protection program lasts four semesters (2 years) and awards 120 ECTS credits upon completion.

The motivation for launching these university specialist programs was to provide graduates in agricultural engineering, as well as Master's degree holders in the field, with specialized professional knowledge in agriculture. With the help of new scientific insights and technologies, graduates are able to contribute personally to the development of their own production units.

The university specialist program enables participants to continually expand and supplement their existing knowledge, as well as to acquire entirely new skills, improving their employment prospects and earning potential.

The competencies gained by participants upon completing the university specialist programs are as follows:

- Quality and Safety of Animal Products: Participants gain knowledge of the latest insights, regulations, and technological solutions related to quality and safety in the production of foodstuffs of animal origin.
- Production Systems in Livestock Farming: Participants acquire the latest knowledge and technological solutions in livestock production systems and animal product technologies, which are key components of livestock production.
- Pig Farming: Participants become capable of independently organizing pig farming production, with the ability to directly apply theoretical and practical knowledge.

- Agricultural Management: Participants gain the latest scientific knowledge on the complex system of business decision-making and economic criteria in agricultural production, along with fundamentals of macroeconomic management and information systems. This program prepares highly skilled professionals in the management and organization of agricultural holdings, whether in family farms or various forms of agricultural enterprises.
- Plant Protection: Participants become proficient in independently identifying (determining) plant pests, organizing and implementing pest control measures, applying both theoretical and practical knowledge, and developing ethical principles related to plant product quality, biodiversity conservation, and environmental protection.

Sveučilište Josipa Jurja Strossmayera u Osijeku
Fakultet agrobiotehničkih znanosti Osijek

KLASA: 602-02/22-06/01
URBROJ: 2158-94-02-22-149
Osijek, 27. rujna 2022.

Na temelju članka 42. Statuta Fakulteta agrobiotehničkih znanosti Osijek – pročišćeni tekst i članka 30. i 50. Pravilnika o poslijediplomskim studijima na Sveučilištu Josipa Jurja Strossmayera u Osijeku, Fakultetsko vijeće Fakulteta agrobiotehničkih znanosti Osijek na 11. redovitoj sjednici u akademskoj godini 2021./2022. održanoj 27. rujna 2022. godine pod točkom 11.2. dnevnog reda na prijedlog Povjerenstva poslijediplomskih specijalističkih studija donijelo je jednoglasno sljedeću

O D L U K U

I.

Prihvaćaju se Izvedbeni planovi poslijediplomskih specijalističkih studija:

"Upravljanje poljoprivrednim gospodarstvom"

"Kakvoća i sigurnost animalnih proizvoda"

"Proizvodni sustavi u stočarstvu"

"Svinjogojstvo" i

"Zaštita bilja"

za akademsku 2022./23. godinu.

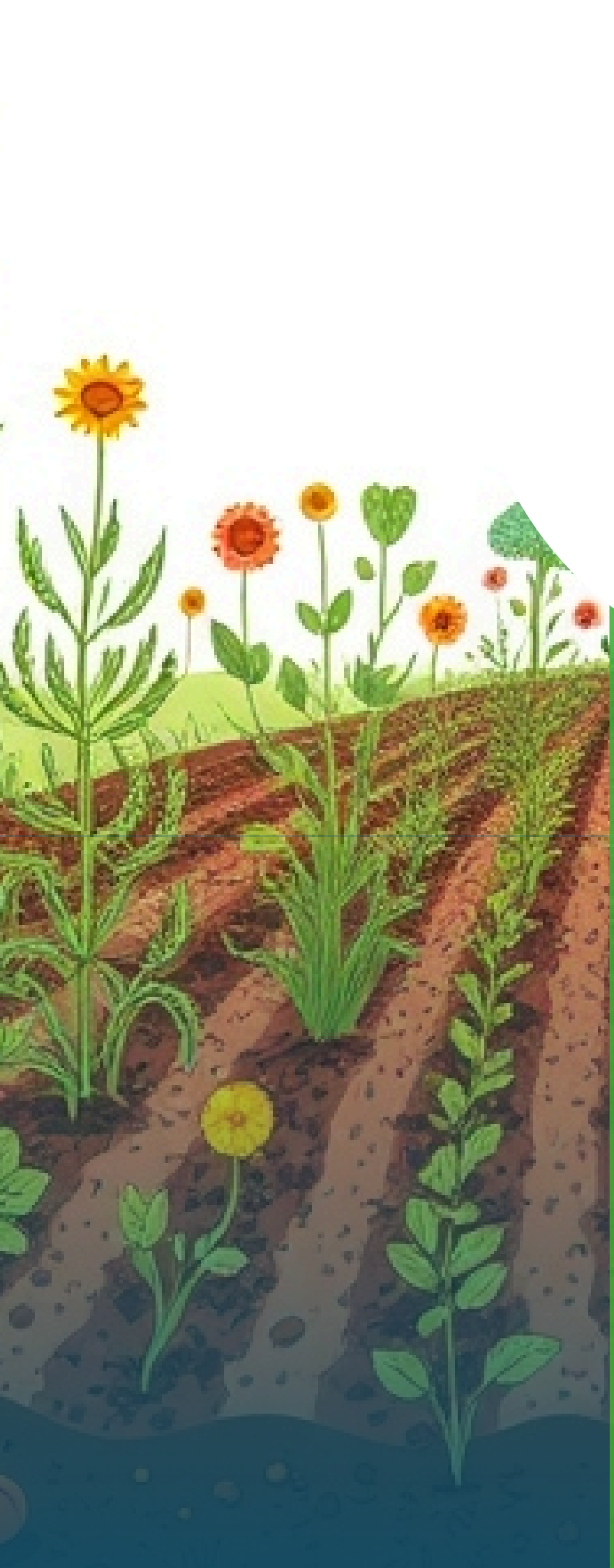
II.

Izvedbeni planovi su sastavni dio ove Odluke.

DEKAN

Prof. dr. sc. Krunoslav Zmaić

Dostaviti:
1. Prodekan za znanost i poslijediplomske studije
2. Ured za poslijediplomske studije
3. Tajništvo Fakulteta
3. Pismohrana Fakultetskog vijeća
4. Pismohrana Fakulteta



LEARNING OUTCOMES

2022./2023.

SPECIALIST STUDIES
FACULTY OF AGROBIOTEHNICAL SCIENCES OSIJEK

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QUALITY AND SAFETY OF ANIMAL PRODUCTS

2. LIST OF COMPULSORY AND ELECTIVE MODULES WITH NUMBER OF TEACHING HOURS REQUIRED FOR THEIR PERFORMING AND ECTS CREDITS ANDLEARNING OUTCOMES FOR EACH MAJOR AND MODULE

2.1. Modules of postgraduate specialist study Quality and Safetyof Animal Products:

Compulsory modules:

	Module name	teaching hours	ECTS credits
1.	Selected Topics in Food Analysis	25	5
2.	Food Microbiology	25	5
3.	Quality and Safety of Animal Products	50	10
4.	Hygiene and Sanitation in Production of Food of Animal Origin	50	10

Elective modules:

	Module name	teaching hours	ECTS credits
1.	Regulations in Production and Transport of Animal Products	25	5
2.	Raw Materials of Animal Origin	25	5
3.	Assessment of Quality and Evaluation of Animal Products (Meat and Milk)	25	5
4.	Production Systems in Animal Science	25	5
5.	Alternative Productions in Animal Science	25	5
6.	Performing Experiments and Analysing Data	25	5
7.	Animal Products for Special Purposes	25	5
8.	The Market of Animal Products	25	5
9.	Molecular Methods in Zootechnics	25	5
10.	Production and Quality of Table Eggs	25	5

2.1.1. Learning outcomes of postgraduate specialist study Qualityand Safety of Animal Products

Module name	**Selected Topics in Food Analysis**	
Module coordinator	Ljiljana Primorac	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, S - 0, E - 5

Module aim

To provide students with an overview of principles and procedures of analysis selected food ingredients. Students also learn application sensory analysis in quality evaluation of meat product.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Evaluate the analysis requirements and select the appropriate methods according to the product.
2. Evaluate the possibilities and limitations of the methods for the determination of the majorfood components and recommend a method.
3. Compare the applicability of immunoassays, chromatographic and spectroscopical methods.
4. Compare the advantages and limitations of certain sensory methods application

Module content

Introduction to food analysis: trends and demands, steps in analysis. National and international standards related to food analysis. Principle of determination of major food components, moisture/total solids, ash, protein, fat, energy value calculation. Principle and application of selected analytical techniques: spectroscopy, chromatography, immunoassays in food analysis. Overview of the methods (affective, descriptive and discriminative), selection and training panelmembers. Exercise: Determination of moisture, ash, protein, fat, scoring of traditional meat product .

Types of teaching

☒ lectures	☒ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are required to do the exercises and prepare report. Participation of students in the discussion during lectures is expected.

Literature

Required reading:

1. Primorac, Lj., Flanjak, I. (2012): Kontrola kakvoće hrane. Prehrambeno-tehnološki fakultet Osijek (interna skripta)
2. Primorac, Lj. (2012): Metode senzorske analize. Prehrambeno-tehnološki fakultet

OsijekRecommended literature:

1. Nielsen, S. S.: Food analysis.Kluwer Academic/plenum Publishers, New York, 2003.
2. Skoog, D. A., West D. M., Holler F. J.: Osnove analitičke kemije. Školska knjiga , Zagreb, 1999.
3. James, C. S.:Analytical chemistry of foods, Chapman & Hall, London 1995.
4. Meilgaard, M., Civille G. V., Carr B. T.: Sensory Evaluation Techniques. CRC Press, London,1991.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.00	1-4	Literature study Laboratory exercises report	Evaluation of reportand student acitivity
Final exam	4.00	1-4	Literature study	Oral examination
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

Lectures and exercises = 1.00 ECTS (25 hours/125 hours of total load x100 = 20.00% from total of5 ECTS)

Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Student opinion questionnaire.

Module name	**Food Microbiology**	
Module coordinator	Gabriella Kanižai Šarić	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L -5 , S - 15, E - 5

Module aim

Introduce the students with a wide range of microbes involved in food spoilage and food poisoning caused by microorganisms (bacteria that cause spoilage, fermentative bacteria, probiotic and pathogenic bacteria, molds, yeast and parasitic protozoa).

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Rank and evaluate the role of microorganisms in food production.
2. Classify and compare microbial populations of different groups of foods.
3. To determine the importance of using microorganisms in the industry.
4. Recommend methods to control microbiological quality of food.
5. Present legislation on microbiological food safety.

Module content

Fungi - morphology and systematics. Microscopic fungi mycelium. Yeasts - morphology and systematics. Protozoa - morphology and systematics. Microbiology of meat and meat products. Microbiology of milk and dairy products. Microbiology of plant products. Microbes as food (single-cell proteins - the origin and application). Feed microbiology. Water Microbiology. Microbes and industrial processes (aerobic and anaerobic processes). Selected properties of most frequently microbes in foods. Control of microbiological food quality. Microbial indicators of safety and quality of foods, the principle of control and microbiological criteria. New systems which guarantee the microbiological food safety.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ fieldwork	☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in twenty minutes using PowerPoint presentations. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coats). After that, students write a final exam. Students are advised to prepare exams from the required literature list.

Literature

Required reading:

1. Duraković., S., Delaš, F., Duraković, L. (2002): Moderna mikrobiologija namirnica - knjiga druga.Kugler d.o.o. Zagreb.
2. Duraković, S., Duraković, L. (2001): Mikrobiologija namirnica-osnove i dostignuća - knjiga druga.Kugler d.o.o. Zagreb.
3. Duraković, S., Duraković, L. (2001): Mikrobiologija namirnicaosnove i dostignuća - knjiga treća.Kugler d.o.o. Zagreb.
4. Duraković, S., Duraković, L. (1998): Priručnik za rad u mikrobiološkom laboratoriju, I. dio knjigaprva. Durieux. Zagreb.

Recommended literature:

1. Gould, G. W. (1995): New Methods of Food Preservation. Aspen Publishers.
2. Mandelstam, J., McQuillan, K., Dawes, I. W. (1982): Biochemistry of Bacterial Growth. Wiley.New York.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student Activity	Assessment methods
Lectures and exercises	0.40	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.60	1-5	literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	4.00	1-5	Preparing for exams bystudying required and recommended literature	Exam (oral or written)
Total	5.00			

The way of calculating ECTS credits for certain activities:

The module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
10 teaching hours (lectures) = 0,40 ECTS (10 teaching hours/125 hours of total load x100 = 8,00% from total of 5 ECTS)
Seminar paper = 0,60 ECTS (15 hours/125 hours of total load x100 = 12,00% from the total of 5 ECTS)Final exam = 4,00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80,00% from the total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and assessment of the mentioned module's quality through anonymousstudent surveys.

Module name	**Quality and Safety of Animal Products**	
Module coordinator	Goran Kušec	
Study programme	Postgraduate specialists study Quality and Safety of Animal Products	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 25, S - 10, E - 15

Module aim

Introduce the students to the methods of quality assurance in the production and processing of animal products as well as the systems of safety.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, students will be able to:

1. Describe the basic principles of application of modern technologies in the production and processing of animal products.
2. List the parameters of chemical composition and explain their importance in animal productsand the methods of their determination
3. Identify and analyze the factors that influence the quality of animal products
4. Select the appropriate zootechnical steps to produce high-quality raw materials in the production of animal products
5. Classify the animal products according to the EU quality systems

Module content

The module contains thematic units organized in lectures (Animal products - quality assurance and quality control) and laboratory exercises, field exercises, and seminars relating to the applicationof new knowledge in the production of animal products. The concept and definition of quality, factors that influence the quality of animal products, sensory and nutritional quality, hygienic and toxicological quality, processing quality, methods for predicting the technological quality, systems for classifying the quality of animal products; criteria for assessing the quality of meat and milk, factors affect the quality of meat and milk; evaluating of carcasses on the slaughter line (pigs, cattle, sheep); evaluating of carcass and meat quality in poultry, determining the origin of the meat (DNA, RNA, proteins, fats). Quality traits of animal products (meat and milk), meat samples classification into quality classes (PSE, DFD, etc.) using a pH meter, Minolta CR-300 device and determining W.H.C; determination of intramuscular fat in the meat samples, the methods of determining composition of carcasses of slaughtered animals, rapid method for determining the freshness and quality of the milk, the basic analysis to evaluating the quality of milk, basics of traditional dairy products; review of laboratory methods for determining the chemical composition of meat.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☒ field work	☐ other

Student requirements

Students are required to prepare for lectures, exercises and seminars by studying the literature. Upon seminar completion, students are obliged to present it orally using the PowerPoint presentation. After fulfilling all of their obligations, students should pass their final exam as prepared using the obligatory literature.

Literature

Required reading:

1. Lawrie, R. A.: Meat Science, Pergamon press, 1991.
2. Cross, H. R. and Overby, A. J.: Meat Science, Milk Science and Technology. Elsevier SciencePublishers, 1988.
3. Lukač-Havranek, J., Rupić, V.: Mlijeko od farme do mljekare, Hrvatska mljekarska udruga,2003.

Recommended literature:

1. Kralik, G., Kušec, G., Kralik, D., Margeta, V.: Svinjogojstvo – biološki i zootehnički principi,Poljoprivredni fakultet u Osijeku, Sveučilište Josipa Jurja Strossmayera u Osijeku, 2007.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.00	1-5	Literature research	Assessing student activity (conversation), reviewing student's work and assignments
Exercises	0.60	1-5	Working on assignments, laboratory research,field work	Overviewing the completed tasks and obtained results
Seminar	0.40	1-5	Literature research, preparing and presenting the results	Seminar evaluation according the given criteria
Final exam	8.00	1-5	Preparation for the exam by studying the recommended literature	Exam (written and oral)

Total	10.00			

The way of calculating ECTS credits for certain activities:
Module carries 10 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)10 ECTS credits = 250 hours of module loads
Lectures = 1 ECTS (25 hours/250 hours of total load x100 = 10 % from total of 10 ECTS)
Exercises = 0.60 ECTS (15 hours/250 hours of total load x100 = 6 % from total of 10 ECTS)
Seminar paper = 0.40 ECTS (10 hours/250 hours of total load x100 = 4 % from total of 10 ECTS)
Final exam = 8 ECTS (200 hours of preparation/250 hours of total load x 100 = 80% from total of10 ECTS)

Module quality assessment
The evaluation of teaching quality using anonymous student surveys.

Module name	**Hygiene and Sanitation in Production of Food of Animal Origin**	
Module coordinator	Mislav Đidara	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 40, S - 0, E – 10

Module aim

Selection and application of procedures in hygiene and sanitation in the production of food of animal origin, and identification and organization of modern technological procedures in veterinary-sanitary inspection and control of foodstuff.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Synthesize, apply and evaluate modern hygienic-sanitary measures.
2. Assess and evaluate the results of sanitary-hygienic measures during milking and during theslaughter of animals.
3. Rank and compare the microbiological standards in animal production.
4. Identify and choose the newer methods and procedures of veterinary-sanitary control in theproduction and processing of meat.
5. Evaluate the results of controls in the production of foods (HACCP, GMP, LISA, etc.).
6. Recommend appropriate measures of veterinary-sanitary inspection and control in foods ofanimal origin.

Module content

Microflora of milk; Sanitation in dairy production; Hygienic-sanitary measures during the preparation of milking, milking and handling of milk after milking; Pathogenic microorganisms in milk (bacterial poisoning); Microbiological standards for milk; Parasites and other pests in milk production; Disinfection, fumigation and pest control; Veterinary-sanitary inspection of meat and organs at the slaughtering line by species of animals; Organisation and programs of veterinary-sanitary control in the production and processing of meat. Modern principles to control the production of foods (HACCP, GMP, LISA, etc.); Meaning of veterinary-sanitary inspection and food control.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare for exercises using recommended reading literature. After that, students write a final exam. Students are advised to prepare exams from required literature

list.

Literature

Required reading:

1. Živković, J. (2001): Higijena i tehnologija mesa. Veterinarsko-sanitarni nadzor životinja za klanjei mesa. Veterinarski fakultet Sveučilišta u Zagrebu.
2. Durakovic, S., F. Delaš, L. Durakovic (2002): Moderna mikrobiologija namirnica. Knjiga druga. Udžbenici Sveucilišta u Zagrebu.
3. Hadžiosmanovic, M., Miokovic, B., Njari, B., Kozacinski, L., Cvrtila, Ž. (2002): Aktualna problematika veterinarsko-sanitarnog nadzora namirnica animalnog podrijetla. veterinarski fakultet, Zagreb.
4. Havranek, J., Rupic, V. (2003): Mijeko od farme do stola. Hrvatska mljekarska udruga, Zagreb.Recommended literature:

1. Gracey, J.F., Collins, D. S., Huey, R. J. (1999): Meat hygiene. 10th Edition. Harcourt Brace and Company.
2. Varnam, A. H., Sutherland, J. P. (1995): Meat and Meat Products. Technology, Chemistry andMicrobiology. First Edition. Chapman & Hall.
3. Longree Karla, Armbuster Gertrude (1987): Quality Food Sanitation. Fourth Edition. John Wileyand Sons. New York Chichester, Brisbane, Toronto, Singapure.
4. Robinson R. K.(1990): Dairy Microbiology. The Microbiology of Milk. Second Edition. ElsevierSc.Publ. LTD. London, New York.
5. IAMFES (1991): Procedures to Implement the Hazard Analysis Critical Control Point. SystemPublished by the International of Milk.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	2.0	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Final exam	8.0	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	10.0			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads
50 teaching hours (lectures + exercises) = 2.0 ECTS (50 teaching hours/250 hours of total load x100 = 20.0% from total of 10 ECTS)
Final exam = 8.0 ECTS (200 hours of preparation/250 hours of total load x 100 = 80,0% from totalof 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality through

anonymousstudent surveys.

Module name	**Regulations in Production and Transport of Animal Products**	
Module coordinator	Goran Kušec	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 10, E - 0

Module aim
Introduce students with relevant regulations related to animal products

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Describe regulations in animal production and traffic.
2. Interpretate and apply regulations in animal production
3. Determine benefits of specific regulations in animal production and traffic
4. Asses composition of the carcasses at the slaughter line
5. Describe regulation necessary in animal production and traffic

Module content
Animal handling before slaughter; categorization and classification of carcasses of slaughtered animals. Regulations in collection and transport of milk. Regulations in the production and processing of raw meat.

Types of teaching

☒ lectures	☒ individual tasks
☒ seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are advised to prepare for seminars and lectures using recommended and obligatory reading literature. Students make seminar papers, which they present orallyusing PowerPoint presentation. Schedule of presentations will be arranged in advance. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Ordinance on the quality of meat products.
2. Ordinance on the quality of animal meat, poultry and game.
3. Regulations on the quality of poultry meat.
4. Rules governing the organization of veterinary-sanitary inspection and control of animalsbefore slaughter and products of animal origin.

Recommended literature:

1. Longree, K., Armbuster, G. (1987): Quality Food Sanitation.
2. Robinson, R. K. (1990): Dairy Microbiology.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-5	Literature studying	Checking student activity orally (conversation), reviewing student'swork and assignments
Seminar	0.40	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	4.00	1-5	Preparing for exam bystudying required and recommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (15 teaching hours / 125 hours of total load x100 = 12.00% from total of 5 ECTS)
Seminar paper = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and module's quality through anonymous student surveys.

Module name	**Raw Materials of Animal Origin**	
Module coordinator	Goran Kušec	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 10, E - 0

Module aim
To introduce students to structure, chemical composition and nutritional characteristics of raw meterial

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Enumerate species and breeds of animals for slaughter
2. Describe deseases of animals for slaughter
3. Describe composition and chemical traits of milk and chemical composition of fish and meat
4. Interpretate role of classification and categorisation of meat

Module content
Breeds of livestock, poultry and game for slaughter; fish systematics; sicknesses of livestock; milkcomposition and production traits; structure and chemical compositтion of meat and fish; marketclassification and characterization of meat.

Types of teaching

☒lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are advised to prepare for lectures by studying required and recommended literature. In agreement with the lecturer student chooses the seminar theme and prepares the seminar paper, which has to be presented in the form of Power Point presentation. Students are advisedto prepare the exam from required literature.

Literature
Required reading:

1. Miletić, S. (1994.): Mlijeko i mliječni proizvodi. Hrvatsko mljekarsko društvo, Zagreb.
2. Havranek, J.,Rupić, V. (2003.): Mlijeko od farme do mljekare. Hrvatska mljekarska udruga,Zagreb.
3. Kovačević, D. (2005.): Sirovine prehrambene industrije - meso i riba, Prehrambeno tehnološkifakultet, Osijek.
4. Treer, T., Safner, R., Aničić, I., Lovrinov, M. (1995.): Ribarstvo, NZ Globus, Zagreb.

Recommended literature:

1. Tratnik, Lj. (1998.): Mlijeko - tehnologija, biokemija i mikrobiologija. Hrvatska mljekarskaudruga, Zagreb.
2. Sabadoš (1996.): Kontrola i ocjenjivanje kakvoće mlijeka i mliječnih proizvoda, Hrvatsko mljekarsko društvo, Zagreb.
3. Kovačevič, D. (2001.): Kemija i tehnologija mesa i ribe, Prehrambeno tehnološki fakultet, Osijek.
4. Pierson, M. D., Corlett, D. A. (1992.): HACCP - Principles and applications, Van NostrandReinhold, New York.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.40	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	4.00	1-5	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (15 teaching hours / 125 hours of total load x100 = 12.00% from total of 5 ECTS)
Seminar paper = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality through anonymousstudent surveys.

Module name	**Assessment of Quality and Evaluation of Animal Products (Meat and Milk)**	
Module coordinator	Ivona Djurkin Kušec	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 0, E - 10

Module aim

To introduce the student to current regulations on grading of animal carcasses, as well as on milk quality assesment; to introduce the student to subjective and objective (sensory and instrumental) methods of quality measurment.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. To identify basic principles of quality assesment of animal products
2. To apply procedures and instruments for determination of quality in meat and milk products
3. To evaluate the product according to its quality
4. To create documents necessary for protection of meat or milk product with PDO (ProtectedDesignation of Origin) or PGI (Protected Geographical Indicationl) label

Module content

Basic principles of meat and milk quality assesment. Determination of milk and meat quality. Grading of meat products: categorization of pig, beef, poultry and sheep meat; dry/cured meat products (kulen, pršut, Slavonian ham). Assesment of quality and categorization of milk and milk products. Determination of quality at slaughter line and in laboratory. Protection of animal products (PDO and PGI labels).

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are required to prepare for lectures and exercises by studying mandatory and recommended literature. Students can enter final exam after succesful completion of exercises.Students are advised to study for the exam from required reading and recommended literature.

Literature

Required reading:

1. Forrest, J. C. and Comp. (1985): Principle of Meat Science. San Francisco.
2. Havranek, J., Rupić, V. (2003.): Mlijeko od farme do mljekare. Hrvatska mljekarska

udruga,Zagreb.

3. Hoffman, K. (2004): What is quality? Definition,measurement and evaluation of meat quality.Meat Focus International, 3, Part 2, February.

Recommended literature:

1. Locker, R. N. and Comp. (1985): New Concepts in Meat Processing, Food Res., New York.
2. Petričić, A. (1984): Konzumno i fermentirano mlijeko. Udruženje mljekarskih radnika Hrvatske,Zagreb.
3. Rahelić, S. (1978): Osnove tehnologije mesa. Školska knjiga, Zagreb.
4. Sabadoš, Dimitrije (1996.): Kontrola i ocjenjivanje kakvoće mlijeka i mliječnih proizvoda. Hrvatsko mljekarsko društvo, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-4	Research the literature	Checking of activity through conversation
Exercises	0.40	2-3	Researching the literature; assessment of quality on instruments	Successful completion of the exercise
Final exam	4.00	1-4	Researching required And recommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1ECTS credit = 25 workload hours (student's working hours)
5 ECTS credits = 125 hours of module loads
Lectures = 0.60 ECTS (15 hours/125 hours of total load x100 = 12.00% from total of 5 ECTS)Exercises = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)
Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 75.00% from total of 5 ECTS)

Module quality assessment
Evaluation of lecturer's work and evaluation of module's quality through anonymous student surveys.

Module name	**Production Systems in Animal Science**	
Module coordinator	Gordana Kralik	
Study programme	Postgraduate professional study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20; E - 0; S - 5

Module aim

To introduce the students with modules biological farm animals and breeding methods in animalhusbandry.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Categorize and compare the individual systems in livestock production,
2. Analyze and use certain methods in livestock breeding,
3. Implement various control production traits and conduct of business registry records,
4. Predict certain ethological features of domestic animals in dependence on the breeding offarm animals,
5. Recommend some system of livestock production in accordance with the most favorable legalprovisions and regulations,
6. From reading seminar paper critically evaluate the latest scientific and professional literatureknowledge, and make certain conclusions.

Module content

Alternative and non-conventional systems of pig raising that are consistent with the principles of the welfare and health of pigs, environmental sustainability and good grazing practices. Breedingmethods, technology of cultivation, nutrition and health care.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students are obliged to prepare for seminars and practice using recommended literature. Students prepare a seminar work that is mandatory and which will be presented orally for about 20 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that, students take part Written exam of topics Exercises. The laying of the exercises, students acquire the right exit to the oral exam from the lecture topics. Students are advised to prepare exams from the successful exam.

Literature

Required reading:

1. Caput, P. (1996): Govedarstvo. Celeber d.o.o. Zagreb
2. Uremović, Z., Uremović, M., Pavić, V., Mioč, B., Mužic, S., Janječić, Z. (2002): Stočarstvo.Agronomski fakultet Sveučilišta u Zagrebu.
3. Brinzej, M., Caput, P., čaušević, Z., Jurić, I., Kralik, G., Nikolič, M., Petričević, A., Srećković, A.,Steiner, Z. (1991): Stočarstvo. Školska knjiga Zagreb.
4. Bogut, I., Grbavac, J., Florijančić, T. (2001): Anatomija i fiziologija domaćih životinja. Sveučilište J.J. Strossmayera Osijek, Sveučilište u Mostaru.
5. Lohle, K., Leucht, W. (1997): Ziegen und Schafe. Verlag E. Ulmer.
6. Mioč, B., Pavić, V. (2002): Kozarstvo. Hrvatska mljekarska udruga,

Zagreb.Recommended literature:

1. Chamber with domestic and international scientific conferences, local and foreign professional and scientific journals.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture and exercise	0.80	1-6	Studying literature, assignments	Checking the activities carried out through oral conversation, delivery and review assignments made
Seminar	0.20	1-6	The study of literature, preparation, and presentation of seminars	Review and evaluation of theseminar work according to pre-established criteria
Final exam	4.00	1-6	Preparation for the examby studying recommended literature	Oral examination
Total	5.00			

The way of calculating ECTS credits for certain activities:

The module has 5 ECTS credits
1ECTS point = 25 hours of workload (hours of student work)5 ECTS = 125 hours of load modules
20 hours of instruction (lectures and practice) = 0.80 ECTS (20 teaching hours / 125 hours total load x 100 = 16% of the total 5 ECTS)
Seminar = 0.20 ECTS (5 hours / 125 hours total load x 100 = 4% of the total 5 ECTS)
Final exam = 4.00 ECTS (100 hours preparation / 125 hours of total work hours x 100 = 80% ofthe total 5 ECTS)

Module quality assessment

The evaluation of teachers and the quality of the above modules through anonymous student surveys.

Module name	**Alternative Productions in Animal Science**	
Module coordinator	Gordana Kralik	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20; E - 0; S - 5

Module aim
To introduce the students to alternative systems in livestock production.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Analyze the alternative systems of livestockl breeding in organic production,
2. Design eco-friendly concepts of livestock production,
3. Develop optimal technological solutions in the feeding of domestic animals,
4. Predict the impact of external environmental factors on individual alternative system ,
5. Recommend alternative system of livestock production in accordance with the most favorablelegal provisions and regulations of the Republic of Croatia,
6. Critically evaluate the latest scientific and professional literature knowledge and make conclusions.

Module content
Alternative and non-conventional systems of raising of the pigs consistent with the principles of the their health and welfare , environmental sustainability and good grazing practices. Breeding methods, cultivation technology, nutrition and health care.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students are obliged to prepare for seminars and practice using recommended literature. Students prepare a seminar work that is mandatory and which will be presented orally for about 20 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that, students take part Written exam of topics Exercises. The laying of the exercises, students acquire the right exit to the oral exam from the lecture topics. Students are advised to prepare exams from the successful exam.

Literature
Required reading:

1. Bataglia, A. R. (2005): Handbook of Livestock Management, Prentice Hall.

2. Senčić, Đ., Antunović, Z., Mijić, P., Baban, M., Puškadija, Z. (2011): Ekološka zootehnika.Poljoprivredni fakultet u Osijeku, Osijek.
3. Zervas, G., Kyriazakis, I. (2003): Organic meat and milk from ruminants. EAAP.
4. Gillespie, J. R. (2003): Modern Livestock and Poultry, Thomson Delmar Learning.
5. Slijepčević, V. (2002): Ekološka proizvodnja. Saturn, Zagreb.
6. Znaor, D. (1996): Ekološka poljoprivreda. Nakladni zavod Globus, Zagreb.
7. Benčević, K. (1993): „Biokont- osnove biološkog poljodjelstva». Poslovna zajednica za stočarstvo, Zagreb.

Recommended literature:

1. «Official Gazette», on-line publications, proceedings from national and international professional and scientific meetings, scientific journals («Meat Science», «Poultry Science», «World's Poultry Journal»...).

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-6	Studying literature, assignments	Checking the activities carried out through oral conversation, delivery and review assignments made
Seminar	0.20	1-6	The study of literature, preparation, and presentation of seminars	Review and evaluation of the seminar work according to pre-established criteria
Final exam	4.00	1-6	Preparation for the examby studying recommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:

The module has 5 ECTS credits
1ECTS point = 25 hours of workload (hours of student work)
5 ECTS = 125 hours of load modules
20 hours of lectures and exercises = 0.80 ECTS (20 teaching hours / 125 hours total load x 100 = 16% of the total 5 ECTS)
Seminar = 0.20 ECTS (5 hours / 125 hours total load x 100 = 4% of the total 5 ECTS)
Final exam =4.00 ECTS (100 hours preparation / 125 hours of total work hours x 100 = 80% of the total 5 ECTS)

Module quality assessment

The evaluation of lecturers and the quality of the above modules through anonymous student surveys.

Module name	**Performing Experiments and Analysing Data**	
Module coordinator	Gordana Kralik	
Study programme	Postgraduate specialist Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 0, E - 10

Module aim

To introduce students to basic statistic procedures. Interpretation of the obtained results. The specificity of experiments in Animal Science. Training students to independently perform scientific research and analysis.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify basic statistical indicators
2. Design experiment
3. Analyze the results after data processing
4. Graphicaly display results of the research
5. Synthesize conclusions of own research with adequate arguments

Module content

Introduction to basic statistical indicators. Planning of experiments. Use of statistical tools in the analysis of experimental data. Displaying and interpreting data obtained by statistical analysis. Conclusions on the basis of statistical analysis.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are expected to prepare for lectures and exercises by studying required and recommended literature. The presence on the exercises is obligatory. After completion of lectures and exercises, students take the final exam. Students are advised to prepare for the examusing obligatory literature.

Literature

Required reading:

1. Kralik, G., Škrtić, Z., Kralik Z. (2012): Biometrika u zootehnici. Grafika, Osijek.
2. Horvat, D., Ivezić, M. (2005.): Biometrika u poljoprivredi. Grafika, Osijek.
3. Šošić, I. (2004.): Primijenjena statistika. Školska knjiga, Zagreb.
4. Gogala, Z. (2001.): Osnove statistike. Nakladništvo Sinergija d.o.o.
5. Šošić J., Serdar V. (2000): Uvod u statistiku. Školska knjiga, Zagreb.

Recommended literature:

1. Jerrold, H. Zar (2007): Biostatistical Analysis, Prantice Hall.
2. Kaps, M., Lamberson, W. R. (2004): Biostatistics for animal science. CABI Publishing, CABInternational, Wallingford, UK.
3. Kaps, M., Lamberson, W. R. (2004): Biostatistics for animal science. CABI Publishing, CABInternational, Wallingford, UK.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-5	Literature studyng	Checking the activities was carried out throughthe oral conversation.
Exercises (laboratory)	0.40	1-5	Working in differentstatistical programs.	Checking activities conducted through discussion of solved task in a statistical program
Exam	4.00	1-5	Preparing for exams bystudying required and recommended literature	Exam (oral)
Total	5.00			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (20 teaching hours/125 hours of total load x100 = 12.00% from total of 5 ECTS)
10 Exercises = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)
Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% fromtotal of 5 ECTS)

Module quality assessment
Evaluation of quality performance modules and teachers' work will be evaluated through anonymous student surveys

Module name	**Animal Products for Special Purposes**	
Module coordinator	Zoran Škrtić	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 10, E - 0

Module aim

To introduce the students to the production and the specifics of animal products for special purposes.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1.Describe the role and importance of animal products in the human nutrition.
2.Explain the role and importance of "functional food" and nutraceuticals.
3.Describe the increase of nutraceutic content in animal products.
4.Recognize the importance and role of animal products for special purposes.
5. Compare the animal products produced in a conventional manner with those for specialpurposes.
6. Evaluate the animal products for special purposes.

Module content

The role and significance of animal products in human nutrition (source of proteins, free aminoacids, lipids and minerals); dietary meat products; physiologicaly active meat and milk comonents ("Functional foood"); fermented milk products with probiotiic characteristics; role of nimal products in nutrition of children, sport professionals and recolavescents.The importance ofnutraceutics in poultry and egg production. PUFA n-3 and CLA in poultry meat and eggs. Lowering of cholesterole content in egg yolk. Increase of lutein and selenium in table eggs.

Types of teaching

☒lectures	☒individual tasks
☒seminars and workshops	☐ multimedia and network
☒exercises	☒laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Participation in lectures, seminars and exercises. Seminar paper and attendance of exercises and laboratory is obligatory. Students choose the topic of seminar paper from offered themes.Seminar written with the paper has to be written by use of Word 2013 software and before presentation. The seminar paper is presented than orally in the form of PowerPoint presentation and should last 10-25 minutes. During lectures and exercises students are advised to keep independent notes. The entire teaching material will be available for students in electronic form.

Literature

Required reading:

1. Kralik G., Adamek, Z., Baban, M., Bogut, I., Gantner, V., Ivanković, S., Katavić, I., Kralik, D., Kralik, I., Margeta, V., Pavličević, J. (2011): Zootehnika. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
2. Kralik G., Has-Schön E., Kralik D., Šperanda M. (2009): Peradarstvo – biološki i zootehnički principi. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
3. Živković, R. (2002): Dijetetika. Medicinska naklada, Zagreb.
4. Bell, D. D., Weaver, W.D. (2001): Commercial Chicken Meat and Egg Production, Springer, USA.
5. Hedrick, B. H., Aberle, E. D., Forrest, J., Judge, M. D. (2001): Principles of Meat Science,Kendall/Hunt Publishing Company.
6. Rose, S. P. (1997): Principles of Poultry Science. CAB Publishing.
7. Kulier, I. (1992): Hrana u službi zdravlja. A.G. Matoš,

Samobor.Recommended literature:

Proceedings of the international conference, the literature available on the Internet, reference scientific journals.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work andassignments
Seminar	0.40	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	4.00	1-6	Preparing for exam by studying required and recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/125 hours of total load x100 = 12.,00% from total of 5 ECTS)

Seminar paper = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality through anonymousstudent surveys.

Module name	**The Market of Animal Products**	
Module coordinator	Zdravko Tolušić	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, S - 10 , E - 0

Module aim

To introduce postgraduate students to new knowledge and the problems occuring in the marketof agricultural products and agromarketing.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Explain the stages of market research.
2. Identify methods of market research.
3. Distinguish and organize the marketing process using the example of the market of animalproducts.
4. Organize and connect MIS (Marketing Information System)
5. Apply elements of the marketing mix in the example of the market of animal products.
6. Create and organize the distribution of animal products.

Module content

Introduction to research, solving problem of agricultural markets in preparation for joining the EU. Learning about the existing problems of the world market (economic, political, legal). Strategies to enter foreign markets (exports of goods and services, leasing, contracting international cooperation, foreign investment, analysis strategies to enter foreign markets.

Types of teaching	☒lectures	☒individual tasks
	☒seminars and workshops	☐ multimedia and network
	☐ exercises	☐ laboratory
	☐ distance education	☒mentoring
	☐ field work	☒other

Student requirements

All students are required to attend minimum 50% of the classes. Students should be prepared for discussion and solving practical tasks using relevant literature. Students should write mandatory seminar. Seminars will be presented orally, with Power Point program and its duration should notbe longer than 20 minutes. Schedule of oral presentations will be agreed in advance. Seminar is precondition for attending oral exams.

Literature

Required reading:

1. Tolušić, Z. (2011): Tržište i distribucija poljoprivredno prehrambenih proizvoda, Grafika Osijek.

2. Bratko, S. (1980): Organizacija tržišnog poslovanja, FOI Varaždin, Varaždin.
3. Goodman, D., Watts, M. J.(1997): Globalizing Food, Agrarian Questions and Global Restructuring, Routleedge, London.
4. Družić, I.(1997): Tranzicijska funkcija poljodjelstva, HAZU, Zagreb.
5. Samardžija, V. (2002): Prilagodbe politikama unutarnjeg tržišta EU, Ministarstvo za Europskeintegracije, Zagreb.

Recommended literature:

1. Kohls, R.-Uhl, J. (1985): Marketing of Agricultural Products, Mc Millan Publisihing Company,New York.
2. Kotler, O. (1994): Upravljanje marketingom, analiza, planiranje, primjena i kontrola, Informator, Zagreb.
3. Meler, M. (1999): Marketing, Sveučilište J. J. Strosmayera Osijek, Ekonomski fakultet uOsijeku.
4. Previšić, J. Ozretić Došen, Đ. (2000): Osnove međunarodnog marketinga, Masmedia, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-6	Participation in the debateand expressing opinions	Attendance of the classes frequency and involvement into discussion
Seminar	0.40	1-6	Literature studying, seminarpreparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam (oral)	4.0	1-6	Preparing for exam bystudying required and recommended literature	Exam- presenting facts, argumenting, analysing case studies
Total	5.00			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (15 teaching hours/125 hours of total load x100 = 12 % from total of 5 ECTS)
Seminar paper = 0.40 ECTS (10 /125 hours of total load x100 = 8.00 % from total of 5 ECTS)
Oral exam = 4.0 ECTS (100 hours of preparation/125 hours of total load x 100 = 80 % from total of 5 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality through anonymousstudent surveys.

Module name	**Molecular Methods in Zootechnics**	
Module coordinator	Ivona Djurkin Kušec	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 5

Module aim

To introduce the student to the methods in Molecular genetics and their usage in Animal Science; introduce the student to thcombination of Marker assisted selection and traditional selection methods with the aim to improve breeding programme.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify molecular methods used in genome analysis which appliable in Animal Science
2. Describe and apply genetic markers and genetic maps
3. Define Marker assisted selection and compare it to the traditional selection methods
4. Apply different nethods based on polymerase chain reaction
5. Apply obtained knowledge and comment the proposed theme

Module content

Methods of molecular analyses of genes and their products; polymorphisms and criptopolymorphisms; gene mapping: linkage and physical gene maps; genetic markers; identification of quantitative trait loci (QTL); candidate and major genes; marker assisted selection (MAS). According to his/her scientific interest student chooses seminar theme. In consonance with the theme referent journals and books will be recommended.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are required to prepare for lectures, laboratory exercises and seminars by studying required literature. In agreement with the lecturer student chooses the seminar theme and prepares the seminar, which has to be presented in the form of Power Point presentation. For the laboratory exercises students are required to bring their own laboratory coats and shoes, while laboratory masks and gloves will be provided by the laboratory during the exercises. Students are advised to prepare the exam from required literature.

Literature

Required reading:

1. Kinghorn, B. and Van der Werf, J. (2000): Identifying and incorporating genetic markers andmajor genes in animal breeding programs. Belo Horizonte.
2. Cox, T. M.and Sinclair, J. (2000): Molekularna biologija u medicini, Medicinska naklada.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-4	Researching the literature	Checking of activity through conversation
Seminar	0.20	5	Researching the literature, making andpresentation of seminar	Review and evaluation according to thepre-established criteria
Exam	3.00	1-5	Preparing for exams bystudying required and recommended literature	Preliminary examand oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

Lectures = 0.80 ECTS (20 hours/125 hours of total load x100 = 16.00% from total of 5 ECTS)

Seminar paper = 0.20 ECTS (5 hours/125 hours of total load x100 = 4.00% from total of 5 ECTS)

Final exam = 3.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 60.00% fromtotal of 5 ECTS)

Module quality assessment

Evaluation of lecturer's work and evaluation of module's quality through anonymous student surveys.

Module name	**Production and Quality of Table Eggs**	
Module coordinator	Zlata Kralik	
Study programme	Postgraduate specialist study Quality and Safety of Animal Products	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, S - 0, E - 5

Module aim
To introduce students with the importance of poultry production, reproduction and egg production. To train students how to evaluate the quality of table eggs.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1.Compare the production and consumption of poultry products in the World and the Republicof Croatia
2 .Identify the characteristics and importance of poultry breeding
3. Specify the recommendations of selection companies for breeding of modern hybrids
4. Compare and evaluate indicators of egg quality
5. Define the differences between conventional and enriched products
6. Synthesize norms relating to the welfare of poultry
7. Specify, according to the regulations, norms for distribution of eggs on the market

Module content
The importance of the poultry production, production and consumption of eggs, creation and production of hybrids, incubation of eggs, modern hybrids in egg production (pullet breeding). Structure and composition of eggs, physical and chemical properties of eggs.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are expected to actively participate during class (consultation). Students are obliged to prepare for laboratory exercises. Attendance at laboratory exercises is obligatory. For laboratory work students need protective laboratory clothing (coat).The student must keep a laboratory diary which submits to the lecturer for review and checking.Students are advised to keep notes during classes (consultation) and laboratory exercises, and exam preparation from the recommended mandatory literature. As part of the lectures PowerPoint presentations will be used to help explain the contents to be discussed during the classes.

Literature

Required reading:

1. Kralik, G., Has-Schon, E., Kralik, D., Šperanda, M. (2008): Peradarstvo - biološki i zootehnički principi. Sveučilišni udžbenik, Grafika, Osijek.

Recommended literature:

1. Sim, J. S., Sunwoo, H. H. (2006): The amazing egg. University of Alberta, Canada.
2. Leeson, S., Summers, J. D. (1997): Commercial Poultry Nutrition. Second Edition. UniversityBooks, Guelph, Canada.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-7	Literature studying	Checking the activities was carried out through the oral conversation.
Exercises (laboratory)	0.20	1-7	Literature studying, work on the laboratory exercises.	Oral conversationand review of laboratory diary
Exam	4.00	1-7	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1ECTS credit = 25 workload hours (student's working hours)
5 ECTS credits = 125 hours of module loads
20 teaching hours (lectures) = 0.80 ECTS (20 teaching hours/125 hours of total load x100 = 16.00% from total of 5 ECTS)
Exercises (laboratory) = 0.20 ECTS (5 hours/125 hours of total load x100 = 4.00% from total of 5 ECTS)
Final exam = 4.00 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Evaluation of quality performance modules and teachers' work will be evaluated through anonymous student surveys

After completing the study, student will be able to:

Learning Outcome 1	To critically evaluate principles of modern technological production and processing of animal products
Learning Outcome 2	To choose procedures and devices for determination of animal products quality (meat, milk, eggs) and methods of analysing basic ingredients in the product
Learning Outcome 3	To interpret regulations necessary in livestock production and traffic
Learning Outcome 4	To recommend appropriate measures of veterinary-sanitary control and inspection of animal-origin food
Learning Outcome 5	To suggest zootechnical and other measures with aim of producing the quality raw material
Learning Outcome 6	To create and organize distribution of animal products

PRODUCTION SYSTEMS IN ANIMAL SCIENCE

2.2. Modules of postgraduate specialist study Production Systemsin Animal Science

Compulsory modules:

	Module name	teaching hours	ECTS credits
1.	Physiology – selected chapters	60	9
2.	Performing Experiments and Processing Results	30	5
3.	Principles of Breeding Domestic Animals	60	9

Elective modules:

	Module name	teaching hours	ECTS credits
1.	Production of Monogastric Animals	60	9
2.	Poligrastic Animals Production	60	9
3.	Farming of Warm Water Fish	60	9
4.	Hygiene and Sanitation in Animal Science	30	5
5.	Alternative Productions in Animal Science	30	5
6.	Animal Products for Special Purposes	30	5
7.	Quality of Animal Products	60	9
8.	Regulations in Livestock Production	30	5
9.	Genetics of Quantitative Traits	30	5
10.	Market of Animal products	30	5

2.2.1. Learning outcomes of postgraduate specialist studyProduction Systems in Animal Science

Module name	**Physiology – selected chapters**	
Module coordinator	Mislav Đidara	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 30, E - 0, S - 30

Module aim
Integrate knowledge about functioning of the animal organism due to the availability of nutrientsand biologically active substances.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Interprete functional anatomy of the digestive tract. Integrate metabolism of nutrients anddifferent parts of digestive tract and cell compartments.
2. Analysed hormons influence on digestive physiology and explain hormonal regulation of takingfeed as well as distribution of the nutrients depending of metabolic status.
3. Integrate influence of liposolubile vitamins ans esencials minerals with nutritive, endocrine andimmune aspects.
4. Critically judge of action of extracellular signals to the functioning of a particular organ system.

Module content
Cell signaling. Cell cycle.Transport systems in the digestion of protein, lipid, essential fatty acid, carbohydrate metabolism, glucose disposal and dependence on other nutrients. Processing new interpretation of the regulation in certain cellular and metabolic processes. Students prepare seminar in the form of research on the topic they have chosen. The seminar is based on the principles of writing a review or original research work.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Participate in the teaching process, prepare literature and solve mathematical problems.

Literature

Required reading:

1. Liker, B. (2000): Osnove fiziologije stanice. Agronomski fakultet Zagreb, Poljoprivredni fakultetu Osijeku.
2. Stilinović, Z. (1993): Fiziologija probave i resorpcije u domaćih životinja. Školska knjiga, Zagreb.
3. Berg, J. M., Tymoczko, J. L., Stryer, L. (2010): Biochemistry. W. H. Freeman.
3. Reece, W. O. (1999): Physiology of domestic animals. Williams& Wilkins, Baltimore, Philadelphia.
4. Underwood, E. J., Suttle, N. F. (2001): The mineral nutrition of livestock. 3 ed. CABI Publishing.
5. Mc Dowell, L. R. (2000): Vitamins in animal and human nutrition. 2ed. Iowa State UniversityPress/Ames.

Recommended literature:

1. Pineda, M. H. (2003): McDonald's Veterinary endocrinology and reproduction. Iowa State Press.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.20	1-3	Studying the literature	Verification activities
Seminar	1.20	1-4	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	6.60	1-4	Preparing for exam bystudying required literature	Exam (oral)
Total	9.00			

The way of calculating ECTS credits for certain activities:

Modul has 9 ECTS credits
1 ECTS = 25 hours
9 ECTS boda = 225 hours
30 hours lectures= 1.20 ECTS (30 hours/225 total load x100 = 13.33% from total 9 ECTS)
Seminar= 1.20 ECTS (30 hours/225 total load x100 = 13.33% from total 9 ECTS)
Final exam= 6.60 ECTS (165 hours/225 total load hours x 100 = 73.34% from total 9 ECTS

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Performing Experiments and Processing Results**	
Module coordinator	Gordana Kralik	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 10, S - 0

Module aim

Introduce students with a statistical method. Interpretation of the results obtained from the data. The specificity of experiments in zootechnicq and presenting data. Training residents to independently perform scientific research and analysis.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify the basic statistical indicators.
2. Desing experiment.
3. Analyze the results after data processing.
4. Results of research display using graphics technique.
5. Synthesize with adequate arguments the conclusions of their research.

Module content

Introduction to basic statistical indicators. Planning of experiments. Using statistical tools in the analysis of experimental data. Displaying and interpreting data obtained by statistical analysis. Adoption of appropriate conclusions on the basis of statistical analysis.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are expected to prepare for classes and exercises studing suggested literature. The presence of the exercises is obligatory. After completion of lectures and exercises, students takethe final exam. Students are advised to prepare exams from obligatory literature.

Literature

Required reading:

1. Kralik, G., Škrtić, Z., Kralik Z. (2012): Biometrika u zootehnici. Grafika, Osijek.
2. Horvat, D., Ivezić, M. (2005.): Biometrika u poljoprivredi. Grafika, Osijek.
3. Šošić, I. (2004.): Primijenjena statistika. Školska knjiga, Zagreb.
4. Gogala, Z. (2001.): Osnove statistike. Nakladništvo Sinergija d.o.o.

Recommended literature:

1. Zar, J.H. (2007): Biostatistical Analysis, Prantice Hall.
2. Kaps, M., Lamberson, W. R. (2004): Biostatistics for animal science. CABI Publishing, CABInternational, Wallingford, UK.
3. Kaps, M., Lamberson, W. R. (2004): Biostatistics for animal science. CABI Publishing, CABInternational, Wallingford, UK.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture and exercises (laboratory)	1.20	1-5	Literature styding, working in different statistical programs.	Checking the activities was carried out through the oral conversation, checking activities conducted through discussion of solved task in a statistical program.
Final exam	3.80	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 teaching hours (lectures+exercises) = 1.20 ECTS (30 hours/125 hours of total load x 100 = 24.00% from total of 5 ECTS)
Final exam = 3.80 ECTS (95 hours of preparation/125 hours of total load x 100 = 76.00% from total of 5 ECTS)

Module quality assessment

Evaluation of quality performance modules and teachers' work will be evaluated by an anonymous student surveys

Module name	**Principles of Breeding Domestic Animals**	
Module coordinator	Dalida Galović	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 40, E - 10, S - 10

Module aim

Familiarize students with the biological bases of modules of domestic animals and breeding methods in animal husbandry.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Define basic assumptions of evolution and domestication process.
2. Identify the causes of hereditary and non-hereditary variability of general and production traitsfor selection.
3. Analyze the variability and correlation of various properties of domestic animals.
4. Define breeding methods (in kinship, outside of kinship, in pure blood, breeding by crossing).
5. Carry out the marking of domestic animals.
6. Keep records of production data.
7. Comment assigned topics related to the conservation of genetic diversity.

Module content

Growth and development of domestic animals (extra and Intrauterine growth. Farming methods. Inbreeding (closely blood relationship, line breeding of animals that are related). Breeding animals out of the relationship (updated blood, raising the lines and branches). Growing in pure blood (breed). Cross breeding (industrial, land improvement, blending, COMBINATION). Crossing between species (hybridization and bastardization). Parent bookkeeping. Preserving genetic diversity..

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are expected to be present and actively participate in the implementation of the module(consultation, preparation for seminars). The obligation of the student's writing seminar paper in the form of review papers on a given subject, which is required to publicly present (PowerPoint presentation for 20 minutes). During the performance of teaching a student is required to take notes and exam preparation to implement the set of references.

Literature

Required reading:

1. Kralik, G., Adamek, Z., Baban, M., Bogut, I., Gantner, V., Ivanković, S., Katavić, I., Kralik, D., Kralik, I., Margeta, V., Pavličević, J. (2011): Zootehnika. Sveučilište J. J. Strossmayera Osijek, Sveučilište u Mostaru, University of South Bohemia in České Budjeovice.
2. Barać, Z. i sur. (2011): Zelena knjiga izvornih pasmina Hrvatske. Ministarstvo zaštite prirode i okoliša, Državni zavod za zaštitu prirode i okoliša, Hrvatska poljoprivredna agencija, Nacionalni park Krka, Zagreb.
3. Kralik, G., Has-Schon, E., Kralik, D., Šperanda, M. (2008): Peradarstvo. Sveučilište J. J. Strossmayera u Osijeku, Sveučilište u Mostaru.
4. Barać, Z., Mioč, B., Čokljat, Z. (2007): Ovčarstvo u Primorsko-goranskoj županiji. Hrvatski savezzadrugara, Zagreb.
5. Kralik, G., Kušec, G., Kralik, D., Margeta, V. (2007): Svinjogojstvo. Sveučilište J. J. Strossmayera u Osijeku, Sveučilište u Mostaru.
6. Mioč, B., Pavić, V. (2002): Kozarstvo. Hrvatska mljekarska udruga, Zagreb.
7. Uremović, Z., Uremović, M., Pavić, V., Mioč, B., Mužic, S., Janječić, Z. (2002): Stočarstvo. Agronomski fakultet Sveučilišta u Zagrebu.
8. Bogut, I., Grbavac, J., Florijančić, T. (2001): Anatomija i fiziologija domaćih životinja. Sveučilište J. J. Strossmayera u Osijeku, Sveučilište u Mostaru.
9. Caput, P. (1996): Govedarstvo. Celeber d.o.o. Zagreb
10. Brinzej, M., Caput, P., Čaušević, Z., Jurić, I., Kralik, G., Nikolič, M., Petričević, A., Srećković, A.,Steiner, Z. (1991): Stočarstvo. Školska knjiga Zagreb.

Recommended literature:

1. Proceedings of Croatian and international congresses, Croatian and international professionaland scientific journals.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures a ndexercises	2.00	1-7	Studying literature.	Checking the activities carried out through the oral interview.
Seminar	0.40	1-7	The study of literature, preparation and presentation of seminars.	Review and evaluation of the seminar work according to pre-established criteria.
Final exam	6.60	1-7	Preparation for the exam by studying the successful exam.	Oral examination.
Total	9.00			

The way of calculating ECTS credits for certain activities:
The module has 9 ECTS credits
1 ECTS credit = 25 hours of workload (hours of student work)
9 ECTS credits = 225 hours of load modules
50 hours of instruction (lectures and exercices) = 2.00 ECTS (50 teaching hours / 225 hours of total work hours x 100 = 22.22% of the total of 9 ECTS)
Seminar = 0.4 ECTS credits (10 hours / 225 hours of total work hours x 100 = 4.44% of the totalof 9 ECTS)
Final exam = 6.60 ECTS credits (165 hours of preparation / 225 hours of total work hours x 100 = 73.34% of the total of 9 ECTS credits).

Module quality assessment
Evaluation of quality performance modules and teachers' work will be evaluated by an anonymous student surveys.

Module name	**Production of Monogastric Animals**	
Module coordinator	Gordana Kralik	
Study programme	Posgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 40, E - 10, S - 10

Module aim

To familiarize the students with the latest knowledge modules of selection and breeding of monogastric animals and technological procedures of monogastric farm animals (poultry and pigs) and poultry and pork.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe breeding objectives and characteristics of modern breeds, types and hybrids monogastric farm animals.
2. Define norms relating to the well-being and health of monogastric farm animals and theenvironment.
3. Recognize trends and attitudes of consumers towards the production and consumption ofproducts of monogastric farm animals.
4. Estimate similarities and differences between conventional and alternative ways of growingmonogastric farm animals.
5. Evaluate quality indicators of meat and products of monogastric farm animals and point outthe differences between industrial and traditional meat and eggs.
6. Designe recipes and production-technological parameters for the production of monogastricfarm animals with added value.
7. Comment (arguments and critical) assigned topics related to producing monogastričnh domestic animals..

Module content

The module is designed in such a way that each student after the completion of lectures and exercises as well as successfully passing the exam can independently manage technological and organizational procedures in pig and poultry farms, farms. Also, the module is covered and scientific section relating to the selection and feeding practices, and research quality meat and eggs and products from pigs and poultry, which provides students independently design and preparation of the dissertation. Topics modules are: Status and Prospects poultry at home and abroad. Characteristics of modern hybrids in the production of parent flocks, hatching eggs, poultry meat and eggs. Trends in conventional selection and breeding. Aligning growth and the need for specific nutritive. Caring for the health of humans and animals. Animal welfare and theimpact on conventional production. Biotechnology in poultry. Caring for the environment and waste disposal. Programs forced moulting. The legal stipulations in modern poultry production. The economic importance of pig production. Perspectives of pig production in Croatia. Modern processes in the selection and reproduction of pigs. Biotechnology in pig production. Breeding programs. Technological processes of pig production. Alternative

farming and pig production.

Behaviour and welfare of pigs. Growth and carcass quality. Production and carcass traits of pigs. Viewing and processing scientific and professional literature in reference journals and publications from international conferences Tour conventional pig and poultry. The preparation of a meal for pigs and poultry with the help of modern computer technology. Determination of the quality of pig meat and poultry as well as the quality and freshness of eggs.

Types of teaching

x lectures
x seminars and workshops
x exercises
☐ distance education
☐ field work
x individual tasks
x multimedia and network
☐ laboratory
☐ mentoring
☐ other

Student requirements

Students are expected to be present and actively participate in the implementation of the module (consultation, preparation for laboratory exercises and seminars). The obligation of the student's writing seminar paper in the form of review papers on a given subject, which is required to publicly present (PowerPoint presentation for 15 minutes). During the performance of teaching a student is required to take notes and exam preparation to implement the set of references.

Literature

Required reading:

1. Kralik, G., Adamek, Z., Baban, M., Bogut, I., Gantner, V., Ivanković, S., Katavić, I., Kralik, D., Kralik,I., Margeta, V., Pavličević, J. (2011): Zootehnika. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
2. Kralik, G., Has-Schön E., Kralik, D., Šperanda, M. (2009): Peradarstvo – biološki i zootehničkiprincipi. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
3. Kralik, G., Kušec, G., Kralik, D., Margeta, V. (2007): Svinjogojstvo – biološki i zootehnički principi.Sveučilišni udžbenik, Grafika d.o.o. Osijek.

Recommended literature:

1. Holden, P. J., Ensminger, M. E. (2006): Swine Science.
2. Referent international journals which publish papers related to the topic of swine production.
3. Bell, D., Weawer W. D. (2001): Commercial chicken Meat and Egg Production. Kluwer AcademicPublisher. Norwell, USA.
4. Leeson, S., Summers, J. D. (1997): Commercial Poultry Nutrition. Second Edition. UniversityBooks, Guelph, Canada
5. Rose, S. P. (1997): Principles of Poultry Science. CAB Publishing.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	2.00	1-7	Studying literature, laboratory work.	Checking the activities carried out through the oral interview and areview of laboratory diary.

Seminar	0.40	1-7	The study of literature, preparation and presentation of seminars.	Review and evaluation of the seminar work according to pre-established criteria.
Final exam	6.60	1-7	Preparation for the exam by studying the successful exam.	Oral examination.
Total	9.00			

The way of calculating ECTS credits for certain activities:
The module has 9 ECTS credits
1 ECTS credit = 25 hours of workload (hours of student work)
9 ECTS = 225 hours of load modules
50 hours of instruction (lectures and practice) = 2.00 ECTS (50 teaching hours / 225 hours of total work hours x 100 = 22.22% of the total of 9 ECTS)
Seminar = 0.4 ECTS credits (10 hours / 225 hours of total work hours x 100 = 4.44% of the totalof 9 ECTS)
Final exam = 6.60 ECTS credits (165 hours of preparation / 225 hours of total work hours x 100 = 73.34% of the total of 9 ECTS credits).

Module quality assessment
Evaluation of quality performance modules and teachers' work will be evaluated by an anonymous student surveys.

Module name	**Poligrastic Animals Production**	
Module coordinator	Zvonko Antunović	
Study programme	Postgraduate specialist study Production Systems in Animal Breeding	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 40, E - 5, S - 15

Module aim

Selection of breeding-technological processes and application of recent technological achievements in poligastric animals breeding.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Compare cattle, sheep, and goat breeds of different production lines and rank their productionsystems.
2. Rank and compare indicators of quality of cattle, sheep and goat products.
3. Apply and validate modern methods and selection procedures in the assessment of the geneticvalue of cattle, sheep and goats.
4. Identify and choose more contemporary methods in the cattle, sheep, and goat reproduction.
5. Evaluate the different kinds of cattle, sheep and goat fattening.
6. Recommend practical solutions in cattle goat and sheep feeding, and choose a healthy mealand feed mixture for different categories of cattle, sheep and goats.

Module content

Dairy, combined and meat breeds of cattle, goats and sheep. Systems of cattle, sheep and goat production. Cattle, sheep and goat reproduction (reproductive system structure, sexual maturation, sexual cycle, manifestation of mating and timely insemination, fertility, reproductive cycle, overhaul). Calf, sheep and goat offspring growing (accommodation, growth and development, nutrition). Cattle, sheep and goat milk production (structure of udder, milk secretion and milking, lactation production characteristics). Production of beef, sheep and goat meat (types and success of fattening, nutrition in fattening, characteristics of fattening of beef cattle, young lambs and kids, slaughter indicators of fattening, ways of keeping fattening beef cattle, lambs and kids). Preparation and presentation of seminar work according to scientific interest of participants. Practical solutions for cattle, sheep and goat feeding, diet standardization and formulation considering the direction of production.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a fifthy-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Kralik, G., Adamek, Z., Baban, M., Bogut, I., Gantner, V., Ivanković, S., Katavić, I., Kralik, D., Kralik, I., Margeta, V., Pavličević, J. (2011): Zootehnika. Sveučilište J. J. Strossmayera Osijek, Sveučilište u Mostaru, University of South Bohemia in České Budjeovice.
2. Barać, Z. et al. (2011): Zelena knjiga izvornih pasmina Hrvatske. Ministarstvo zaštite prirode i okoliša, Državni zavod za zaštitu prirode i okoliša, Hrvatska poljoprivredna agencija, Nacionalni park Krka, Zagreb.
3. Mioč, B., Pavić, V. (2002): Kozarstvo. Hrvatska mljekarska udruga, Zagreb.
4. Uremović, Z., Uremović, M., Pavić, V., Mioč, B., Mužic, S., Janječić, Z. (2002): Stočarstvo. Agronomski fakultet Sveučilišta u Zagrebu.
5. Mioč, B., Pavić, V., Sušić, V. (2007): Ovčarstvo. Hrvatska mljekarska udruga, Zagreb.
6. Caput, P. (1996): Govedarstvo. Celeber d.o.o. Zagreb.
7. Domaćinović, M., Antunović, Z., Džomba, E., Opačak, A., Baban, M., Mužic, S. (2015): Specijalnahranidba domaćih životinja. Poljoprivredni fakultet u Osijeku, Osijek.

Recommended literature:

1. Senčić, Đ., Antunović, Z., Mijić, P., Baban, M., Puškadija, Z. (2011): Ekološka zootehnika. Poljoprivredni fakultet u Osijeku.
2. Proceedings of national and international scientific congresses, national and international professional and scientific journals.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.80	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.60	1-6	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	6.60	1-6	Preparing for exam bystudying required andrecommended literature	Exam (oral or written)
Total	9.00			

The way of calculating ECTS credits for certain activities:

Module carries 9 ECTS credits

1ECTS credit = 25 workload hours (student's working hours)9 ECTS credits = 225 hours of module loads

45 teaching hours (lectures + exercises) = 1.80 ECTS (45 teaching hours/225 hours of total load x100 = 20.00% from total of 9 ECTS)

Seminar paper = 0.60 ECTS (15 hours /225 hours of total load x100 = 6.67% from total of 9 ECTS)Final exam = 6.60 ECTS (165 hours of preparation/225 hours of total load x 100 = 73.33% from total of 9 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Farming of Warm Water Fish**	
Module coordinator	Anđelko Opačak	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 40, E - 5, S - 15

Module aim

Participants of the study program will be introduce with the basic principles and recent advances in the technologies of production of warm-water fish in the various systems and forms of cultivation. Also they we be capable to determine the environmental sustainability and profitability of production.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe the basics of farming technology of warm-water fish in the carp ponds, farming in cage systems in the sea and fresh water, farming in silo, recirculation system, and combined systems.
2. Anticipate problems in the cultivation of warm-water fish on the basis of environmental (physical and chemical) and biological factors of the production environment (ponds, cages, recirculating systems, swimming pools for breeding) and choose the appropriate technology solutions for environmentally sustainable and economically profitable production.
3. Define a marketing concept of production in different rearing systems of production of freshwater and marine fish species and to describe the various forms of fish farming
4. Recognize and identify the most critical technological moments in the breeding of warm-water fish in a particular breeding system with emphasis on the utilization of the genetic potential of growth, nutrition, health care and fish production economics.

Module content

Situation and perspectives of warm water fish production in the climatic conditions of the Republic of Croatian, status of aquaculture in the world, fish farms as production units, types pond category, hydro-technical facilities on the pond, agro-technical measures carried out on the ponds, the fish farm machinery, hydrochemistry, phytoplankton and zooplankton communities in pond, principles of maintaining optimal living conditions in the pond, methods of spawning warm water fish and procedures in the hatchery, breeding early stages of warm-water fish, breeding fingerlings, fry and adult fish in different production systems, determining the productivity of ponds, rearing in monoculture, normal rearing , dense rearing, rearing in monoculture with different age groups, rearing in polyculture, basics of feeding fish in different rearing systems, control fishing, production and technological parameters in the cultivation of warm-water fish, fish mortality in breeding, wintering fish, storage and delivery to the market . The most common fish diseases in freshwater fisheries, economic indicators of production of warm water fish.

Types of teaching	☒ lectures	☒ individual tasks
	☒seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratory
	☐ distance education	☐ mentoring
	☒ field work	☐ other

Student requirements

Students are expected to continusly attend the courses and actively participate in the tasks during the lectures and exercises. During lectures, students will carry out exercises in the laboratory that are required to successfully complete the course. At the beginning of the semester students mustchoose a topic for seminar work in consultation with the assistant and then the prepared topic submit in a written copy. The final exam is oral. Students are advised to keep notes during lectures and to prepere for exam from mandatory literature. During the lectures PowerPoint presentations will be used to help explain the contents of topics discussed in lectures. The presentations are available on the website of the Department for hunting, fishing and beekeeping.

Literature

Required reading:

1. Gatlin, D.M., Li, P. (2008): Use of diet additive to improve nutritional value of alternativeprotein sources. In: Alternative Protein Sources in Aquaculture Diet. C. Lim, C. D. Webster and
C.S. Lee (eds.). New York:Haworth Press. pp. 501-522.
2. Timomons, M.B., Ebeling, J.M. (2007): Recirculating Aquaculture, NRAC Publication.
3. Bogut, I., Novoselić, D., Pavličević, J. (2006): Biologija riba. Poljoprivredni fakultet Osijek,Agronomski fakultet Mostar, Osijek-Mostar.
4. Bogut, I., Horvath, L., Adamek, Z., Katavić, I. (2006): Akvakultura. Poljoprivredni fakultet Osijek,Agronomski fakultet Mostar, Osijek-Mostar.
5. Fijan, N. (2006): Zdravstvena zaštita riba. Poljoprivredni fakultet Osijek, Agronomski fakultetMostar, Osijek-Mostar.
6. Jirasek, J., Mareš, J., Zeman, L. (2005): Potreba živin a tabulky vyživne hodnoty krmiv pro ryby.Mendelova zemedelska a lesnicka univerzita v Brne.
7. Treer, T., Safner, R., Aničić, I., Lovrinov, M. (1995.): Ribarstvo. Nakladni zavod «Globus», Zagreb.
8. National Research Council (1993): Nutrient Requirements of Fish. Washington, D.C.:NationalAcademy Press.
9. Steffens, W. (1989): Principles of fish nutrition. England: John Wiley &Sons, 1989., 379 p.
10. Antalfi, A., Tolg Istvan (1974): ABC ribnjačarstva. Osijek.
11. Bojčić, C. i sur. (1982): Slatkovodno ribarstvo. Jumena, Zagreb.
12. Livojević, Z. i sur. (1967): Priručnik za slatkovodno ribarstvo. Agronomski glasnik,

Zagreb.Recommended literature:

1. Bauer, J. (1972): Upusno – ispusni objekti na ribnjacima. Ribarstvo, 27: 108-110.
2. Billard, R. (1999): The Carp Biology and Culture. Aquaculture and Fisheries, Springer PraxisBooks, s. 342.
3. Durborow, R. M., Crosby, D. M., Brunson, M. W. (1997): Nitrite in fish ponds. SRAC PublicationNo.462.
4. Halver, J. E. (2002): The vitamins. In: Fish Nutrition. J. E. Halver and R.W. Hardy (eds.),

3rdedition. London: Academic Press. pp. 61-141.

5. Hardy, R. W., Barrows, F. T. (2002): Diet formulation and manufacture. In: Fish Nutrition J.E.Halver and R. W. Hardy (eds.), 3rd edition. London: Academic Press. pp. 505-600.
6. Hargreaves, J. A., Tucker, C. S. (2004): Managing ammonia in fish ponds. SRAC Publication No.4603.
7. Hargreaves, J., Brunson, M. (1996): Carbon dioxide in fish ponds. SRAC Publication No.468
8. Shephard, J., Bromage, N. (1988): Intensive Fish farming. Oxford, London, Edinburgh, Boston,Palo Lato, Melbourne, s. 404.
9. Steffens, W. (1985): Grundlagen der Fischernährung. WEB Gustav Fischer Verlag Jena, s. 226.
10. Stević, I., Tabori, Z., Prica, M., Morogoš, Ž. (1987): Automatske hranilice na daljinsko upravljanje kao inovacija u uzgoju šaranskog mlađa. Ribarstvo, 42: 1-6.
11. Wursts, W. A., Durborow, R. M. (1992): Interaction of pH, carbon dioxide, alkalinity andhardness in fish ponds. SRAC Publication No.464..

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and excercises	1.80	1-4	Active participation in class, literature studying, assignmentsin class, nutritional standards for fish, control fishing journal, laboratory work and field work	Oral discussion with students, review of solved tasks and journal
Seminar	0.60	1-4	A literature review, preparationand presentation of seminars	Review and evaluation of the seminar according to predetermined criteria
Final exam	6.60	1-4	Preparation for the exam bystudying recommended literature	oral exam
Total	9.00			

The way of calculating ECTS credits for certain activities:

Modul carries 9 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)9 ECTS credits = 225 hours of module loads
45 teaching hours (lectures + exercises) = 1.80 ECTS (45 hours/225 hours of total load x 100 = 20.00% of total 9 ECTS credits)
Seminar work = 0.60 ECTS (10 hours of seminar /225 hours of total load x 100 = 6.67% of total 9 ECTS)
Final exam = 6.60 ECTS (165 hours of preparing/225 hours of total load x 100 = 73.33% od ukupno 9 ECTS)

Module quality assessment

By using anonymous student surveys to evaluate the work of teachers and the quality of the module.

Module name	**Hygiene and Sanitation in Animal Science**	
Module coordinator	Mislav Đidara	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E – 10, S - 0

Module aim

To familiarize the students with the possibilities of the module practical application of the latestscientific knowledge in the field of hygiene and sanitation in livestock.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Synthesize, apply and evaluate modern methods of hygiene assessment and analysis ofdrinking water.
2. Assess and evaluate hygiene measures in the pasture and barn.
3. Rank and compare indicators of microclimate conditions and apply their conditioning.
4. Identify and choose the newer methods and procedures for accommodation and hygiene ofdomestic animals.
5. Evaluate the hygienic-sanitary measures.
6. Recommend appropriate measures of disinfection, pest and rodent control.

Module content

Module includes hygienic standards in animal production, as well as sanitation measures in casesof unfavorable hygienic conditions. Thematic units are divided in such a way that the first range of soil and water as the primary factors of hygiene in animal husbandry. The study of microclimate gives students the opportunity to consider the possibility of technical solutions necessary for their conditioning through understanding the needs of different types of animals. The work in disinfection, pest and rodent control as specific hygiene measures includes the last part of the module.

Types of teaching

- ☒ lectures
- ☐ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. After that, students write a final exam. Students are advised to prepare exams from required literaturelist.

Literature

Required reading:

1. Asaj, A. (2003): Higijena na farmi i okolišu. Medicinska naklada, Zagreb.
2. Tofant, A., Vučemilo, M. (2003): Voda u veterini – potrebe i utjecaj na okoliš. Sveučilište uZagrebu, Veterinarski fakultet, Zagreb.
3. Vučemilo, M., Tofant, A., Pavičić, Ž. (2002): Higijena smještaja i držanja preživača na obiteljskimgospodarstvima. Sveučilište u Zagrebu, Veterinarski fakultet, Zagreb.
4. Vučemilo, M.,Tofant, A., Pavičić, Ž. (2002): Mjere sanitacije u veterinarskoj medicini. Sveučilišteu Zagrebu, Veterinarski fakultet, Zagreb.
5. Asaj, A. (1999): Zdravstvena dezinfekcija u nastambama i okolišu. Medicinska naklada, Zagreb.
6. Vučemilo, M., Tofant A. (1998): Higijena držanja i smještaja, okoliš – zdravlje i dobrobitživotinja. Sveučilište u Zagrebu, Veterinarski fakultet, Zagreb.

Recommended literature:

1. Pugliese, A., Gaiti, A., Boiti, C. (2012): Veterinary Science: Current Aspects in Biology, Animal Pathology, Clinic and Food Hygiene. Springer, 15.
2. Pierce, W. D. (2012): Sanitary Entomology: The Entomology of Disease, Hygiene and Sanitation.Classical Reprint Series.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.20	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Final exam	3.80	1-6	Preparing for exam bystudying required andrecommended literature	Exam (oral or written)
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 teaching hours (lectures + exercises) = 1.20 ECTS (20 teaching hours/125 hours of total load x100 = 24.00% from total of 5 ECTS)
Final exam = 3.80 ECTS (95 hours of preparation/125 hours of total load x 100 = 76,00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Alternative Productions in Animal Science**	
Module coordinator	Gordana Kralik	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 10

Module aim
To familiarize the students with modules alternative systems in livestock production.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. To analyze the alternative systems of domestic animal breeding in organic production.
2. To design eco-friendly concepts of livestock production.
3. Develop optimal technological solutions in the feeding of certain species of domestic animals.
4. Predict the impact of external environmental factors on individual alternative system ofbreeding of domestic animals.
5. Recommend fifth alternative system of livestock production in accordance with the mostfavorable legal provisions and regulations of the Republic of Croatia.
6. From proučenog seminar paper critically evaluate the latest scientific and professional literature knowledge, and make certain conclusions.

Module content
Alternative and non-conventional systems of keeping pigs that are consistent with the principles of the welfare and health of pigs, environmental sustainability and good grazing practices. Breeding methods, technology of cultivation, nutrition and health care.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students are obliged to prepare for seminars and practice using recommended literature. Students prepare a seminar work that is mandatory and which will be presented orally for about 20 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that, students take part Written exam of topics Exercises. The laying of the exercises, students acquire the right exit to the oral exam from the lecture topics. Students are advised to prepare exams from the successful exam.

Literature
Required reading:

1. Bataglia, A. R. (2005): Handbook of Livestock Management. Prentice Hall.

2. Senčić, Đ., Antunović, Z., Mijić, P., Baban, M., Puškadija, Z. (2011): Ekološka zootehnika.Poljoprivredni fakultet u Osijeku, Osijek.
3. Zervas, G., Kyriazakis, I. (2003): Organic meat and milk from ruminants. EAAP.
4. Gillespie, J. R. (2003): Modern Livestock and Poultry, Thomson Delmar Learning.
5. Slijepčević, V. (2002): Ekološka proizvodnja. Saturn, Zagreb.
6. Znaor, D. (1996): Ekološka poljoprivreda. Nakladni zavod Globus, Zagreb.
7. Benčević, K. (1993): „Biokont- osnove biološkog poljodjelstva». Poslovna zajednica za stočarstvo, Zagreb.

Recommended literature:

1. «Official Gazette», publications available on the internet, Proceedings from national and international professional and scientific congresses, referred world scientific journals («Meat Science», «Poultry Science», «World's Poultry Journal»...).

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture and exercise	0.80	1-6	Studying literature, assignments	Checking the activities carried out through oral conversation, delivery and review assignments made
Seminar	0.40	1-6	The study of literature, preparation, and presentation of seminars	Review and evaluation of the seminar work according to pre-established criteria
Final exam	3.80	1-6	Preparation for the exam by studying recommended literature	Oral examination
Total	5.00			

The way of calculating ECTS credits for certain activities:
The module has 5 ECTS credits
1 ECTS credit = 25 hours of workload (hours of student work)
5 ECTS credits = 125 hours of load modules
20 hours of instruction (lectures and practice) = 0.80 ECTS (20 teaching hours / 125 hours total load x 100 = 16.00% of the total 5 ECTS)
Seminar = 0.40 ECTS (10 hours / 125 hours total load x 100 = 8.00% of the total 5 ECTS)
Final exam = 3.80 ECTS (95 hours preparation / 125 hours of total work hours x 100 = 76.00% ofthe total 5 ECTS)

Module quality assessment
The evaluation of teachers and the quality of the above modules via anonymous student surveys.

Module name	Animal Products for Special Purposes	
Module coordinator	Zoran Škrtić	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 5, S - 5

Module aim

The module students will learn about the production and the specifics of animal products for special purposes.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1.Describe the importance and role of animal products in the diet of humans.
2.Explain the importance and role of "functional food" and nutraceuticals.
3.Describe the contents of nutraceuticals increase in animal products.
4.Recognize the importance and role of animal products for special purposes.
5. Compare the animal products produced in a conventional manner with those for specialpurposes.
6. Evaluate the animal products for special purposes.

Module content

The importance of correct nutrition for the humans. Trends in the diet throughout history. Understanding the advantages and disadvantages of consumption animal products. Improving the quality of conventional animal products.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☒ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Participation in classes, seminars and exercises attendance. The creation of seminars is reuired and attendance at exercises in the laboratory. Seminar choosing from already offered topics that are related to the topics of the curriculum or of their choice related to the curriculum.The seminaris written with the help of Word 2013 and before oral presentations submitted to the teacher.Oral presentation of the seminar lasts 10-25 minutes. The presence and active participation of students in exercises which will take place in the laboratory "Center of Excellence", Faculty of Agriculture is required. Exercises relating to the determination of the quality and specificity of the product for special purposes.The final exam is scheduled for all students. During lectures and exercises students are advised to conduct independent records. The entire teaching material will be available in electronic form for students.

Literature

Required reading:

1. Kralik, G., Adamek, Z., Baban, M., Bogut, I., Gantner, V., Ivanković, S., Katavić, I., Kralik, D., Kralik,I., Margeta, V., Pavličević, J. (2011): Zootehnika. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
2. Kralik, G., Has-Schön, E., Kralik, D., Šperanda, M. (2009): Peradarstvo – biološki i zootehničkiprincipi. Sveučilišni udžbenik, Grafika d.o.o. Osijek.
3. Živković, R. (2002): Dijetetika. Medicinska naklada, Zagreb.
4. Bell, D. D., Weaver, W. D. (2001): Commercial Chicken Meat and Egg Production, Springer, USA.
5. Hedrick, B. H., Aberle, E. D., Forrest, J., Judge, M. D. (2001): Principles of Meat Science,Kendall/Hunt Publishing Company.
6. Rose, S. P. (1997): Principles of Poultry Science. CAB Publishing.
7. Kulier, I. (1992): Hrana u službi zdravlja. A.G. Matoš,

Samobor.Recommended literature:

Proceedings of the international conference, the literature available on the Internet, reference scientific journals.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.00	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	3.80	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
25 teaching hours (lectures + exercises) = 1.00 ECTS (25 teaching hours/125 hours of total load x100 = 20.00% from total of 5 ECTS)
Seminar paper = 0.20 ECTS (5 hours/125 hours of total load x 100 = 4.00% from total of 5 ECTS)
Final exam =3.80 ECTS (95 hours/125 hours of total load x 100 = 76.00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Quality of Animal Products**	
Module coordinator	Ivona Djurkin Kušec	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	9
	Lecture hours (L+E+S)	L - 40, E - 10, S - 10

Module aim

Introduce the students with the methods of quality assurance in production and processing of animal products as well as with the systems of safety.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe the basic principles of application of modern technologies in production and processing of animal products.
2. List the parameters of chemical composition and explain their importance in animal productsand the methods of their determination.
3. Identify and analyze the factors that influence the quality of animal products.
4. Select the appropriate zootechnical steps in order to produce high quality raw materials in theproduction of animal products.
5. Classify the animal products according to the EU quality systems.

Module content

Module contains thematic units organized in lectures (Animal products - quality assurance and quality control) and laboratory exercises, field exercises and seminars relating to the application of new knowledge in the production of animal products. The concept and definition of quality, factors which influence the quality of animal products, sensory and nutritional quality, hygienic and toxicological quality, processing quality, methods for predicting the technological quality, systems for classifying the quality of animal products; criteria for assessing the quality of meat and milk, factors affect the quality of meat and milk; evaluating of carcasses on the slaughter line (pigs, cattle, sheep); evaluating of carcass and meat quality in poultry, determining the origin of the meat (DNA, RNA, proteins, fats). Quality traits of animal products (meat and milk), meat samples classification into quality classes (PSE, DFD, etc.) using a pH meter, Minolta CR-300 device and determining W.H.C; determination of intramuscular fat in the meat samples, the methods of determining composition of carcasses of slaughtered animals, rapid method for determining the freshness and quality of the milk, the basic analysis to evaluating the quality of milk, basics of traditional dairy products; review of laboratory methods for determining the chemical composition of meat.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are required to prepare for lectures, exercises and seminars by studying the literature. Upon seminar completion, students are obliged to present it orally using the PowerPoint presentation. After fulfilling all of their obligations, students should pass the final exam as prepared using the obligatory literature.

Literature

Required reading:

1. Lawrie, R. A. (1991): Meat Science. Pergamon press.
2. Cross, H. R., Overby, A.J. (1988): Meat Science, Milk Science and Technology. Elsevier SciencePublishers.
3. Lukač-Havranek, J., Rupić, V. (2003): Mlijeko od farme do mljekare. Hrvatska mljekarska udruga.

Recommended literature:

1. Kralik G., Kušec, G., Kralik, D., Margeta, V. (2007): Svinjogojstvo – biološki i zootehnički principi. Sveučilišni udžbenik, Poljoprivredni fakultet u Osijeku, Sveučilište Josipa Jurja Strossmayera u Osijeku.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures + exercises	2.00	1-5	Literature research, working on assignments, laboratory research, fieldwork	Assessing student activity (conversation), reviewing student's work and assignments, overviewing thecompleted tasks and obtained results
Seminar	0.40	1-5	Literature research, preparing and presenting the results	Seminar evaluation accordingthe given criteria
Final exam	6.60	1-5	Preparation for the exam by studying the recommended literature	Exam (written and oral)
Total	9.00			

The way of calculating ECTS credits for certain activities:

Module carries 9 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)9 ECTS credits = 225 hours of module loads
Lectures and exercises = 2.00 ECTS (50 hours/225 hours of total load x100 = 22.22% from total of 9 ECTS)
Seminar paper = 0.40 ECTS (10 hours/225 hours of total load x100 = 4.44% from total of 9 ECTS)Final exam = 6.60 ECTS (165 hours of preparation/225 hours of total load x 100 = 73.34% fromtotal of 9 ECTS)

Module quality assessment

The evaluation of teaching quality using anonymous student surveys.

Module name	**Regulations in Livestock Production**	
Module coordinator	Goran Kušec	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 10

Module aim
To introduce the student to regulations and methods of assessment of carcass composition at theslaughter line.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Describe regulation necessary in animal production and traffic.
2. Interpretate and apply regulations in animal production
3. Determine benefits of specific regulations in animal production and traffic
4. Asses composition of the carcasses at the slaughter line

Module content
Positive regulations in Croatia and EU for animal production and traffic; interpretation and implementation of regulations in animal production. The titles of the seminars will be recommended to students, as well as relevant journals containing professional and scientific manuscripts necessary for writing the seminar according to student's scientific interest.

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are required to prepare for lectures by researching relevant literature. Before enetringthe exam students need to succesfully elaborate and present seminar paper. Students are advised to study for the exam from obligatory and recommended literature.

Literature
Required reading:

1. Regulation on Quality of Pig Carcasses
2. Ordinance on the quality of bovine carcasses
3. Ordinance on the quality of sheep carcasses.
4. Ordinance on measures for the control and eradication of trichinosis.
5. Regulations on organic production of animal products.6. Zakon o stočarstvu
7. Veterinary Act
8. Ordinance on measures to control and eradicate foot-and-mouth disease

9. The Animal Welfare Act
10. Law on organic production of agricultural products and

foodstuffsRecommended literature:

Other regulations accessible from the internet

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-4	Researching the literature	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.40	3-4	Researching the literature, making and presentation of seminar paper	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	3.80	1-4	Researching required And recommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
Lectures = 0.80 ECTS (20 hours/100 hours of total load x125= 16.00% from total of 5 ECTS)
Seminar = 0.40 ECTS (10 hours/100 hours of total load x125 = 8.00% from total of 5 ECTS)
Final exam = 3.80 ECTS (95 hours of preparation/125 hours of total load x 100 = 76.00% from total of 5 ECTS)

Module quality assessment
Evaluation of lecturer's work and evaluation of module's quality through anonymous student surveys.

Module name	**Genetics of Quantitative Traits**	
Module coordinator	Nikola Raguž	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 10, E - 10, S - 10

Module aim

Integrate knowledge of quantitative traits in practical application through the selection and improvement of the effects of selection for economically important traits in animal production.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe the characteristics of quantitative traits and their variability with the help of appropriate statistical methods.
2. Explain the importance of knowing the concept of similarity between related individuals.
3. Interpret genetic and non-genetic component of variance and their relation to phenotypicvariance.
4. To assess the genetic parameters and breeding value estimate using different statisticalmethods and models.
5. Understand the concept of selection on the basis of phenotypic information and marker-assisted selection.

Module content

The models of action of genes in the inheritance of quantitative traits. Statistical methods in the analysis of the variability of quantitative traits. The importance of the concept of similarity amongrelated individuals in the population in order to understand the concept of heritability and breeeding values. Linear methods and statistical models to estimate genetic parameters and breeding values. Polymorphism, molecular markers and detection of quantitative trait lokus (QTL). Maping the genom and genomic breeding value.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All student will prepare for seminars using recomended reading literature. Students make individual seminar work, which they present orally in a twenty-minute period using Power Pointpresentation. Schedule of presentations will be arranged in advance. After that, students have oral exame. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Falconer, D. S., Mackay; T. F. (1996): Introduction to Quantitative Genetics. Longman Group.
2. Jovanovac, S. (1996): Populacjiska genetika domaćih životinja. Interna skripta. Poljoprivrednifakultet u Osijeku
3. Jovanovac, S. (2013): Principi uzgoja životinja. sveučilišni udžbenik. Poljoprivredni fakultet u Osijeku
4. Mrode, R. A., Thompson, R. (2005): Linear Models to Prediction of Animal Breeding Values.CABI Publishing.

Recommended literature:

1. Lynch, M., Walsh, B. (1998): Genetic and Analysis of Quantitative traits. Sinauer Associates, Inc
2. Hayes, B., Goddard, M. E. (2001): The distribution of gene effects of genes affecting quantitative traits in livestock. Genetic Selection Evolution 33, 209 -229.
3. Weller, J. I. (2009): Quantitative traits Loci Analysis in Animals. 2nd edition.CAB International.
4. Dekkers, J. C. M, Van der Werf, J. (2007): Strategies and opportunities for marker assisted selection in livestock: Section III. - Marker assisted selection in livestock - Case studies. Marker assisted selection. Current status and future perspectives in crops, livestock, forestry and fish. FAO, Rome 165 - 18

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures + exercises	0.80	1-5	Studying literature, activeparticipation in teaching	Verification of activities performed through an oral interview
Seminar	0.40	1-5	The study of literature, preparation of seminar paper,oral presentation	Review and evaluation of the seminar work according to established criteria
Final exam	3.80	1-5	Preparation for the exam according to the contents of the module	The exam is oral.
Total	5.00			

The way of calculating ECTS credits for certain activities:

Modul carries 5 ECTS credits
1 ECTS = 25 workload hours (student's working hours)
5 ECTS credits = 125 hours of model loads
20 teaching hours (lectures+exercices) = 0.80 ECTS (20 teaching hours/125 hours of total load x100 = 16.00% from total of 5 ECTS)
Seminar paper = 0.40 ECTS (10 hours/125 hours of total load x 100 = 8.00% from total of 5 ECTS)
Final exam = 3.80 ECTS (95 hours of preparation/75 hours of total load x 100 = 76.0% from total of 5 ECTS)

Module quality assessment

Evaluation of techer's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Market of Animal Products**	
Module coordinator	Igor Kralik	
Study programme	Postgraduate specialist study Production Systems in Animal Science	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 10

Module aim
To introduce postgraduate students about new knowledge and the problems occuring in the market of agricultural products and agromarketing.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Define and explain the stages of market research.
2. Identify methods of market research.
3. Distinguish and organize the marketing process using the example of the market of animalproducts.
4. Organize and connect MIS (Marketing Information System).
5. Apply elements of the marketing mix in the example of the market of animal products.
6. Create and organize the distribution of animal products.

Module content
Introduction to research, solving problem of agricultural markets in preparation for joining the EU. Learning about the existing problems of the world market (economic, political, legal). Strategies to enter foreign markets (exports of goods and services, leasing, contracting international cooperation, foreign investment, analysis strategies to enter foreign markets.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are expected to actively participate during class (consultation). All students are obliged to prepare are for seminars. Writing the seminars is obligatory. Seminar is a review article on a given topic, who will the student in advance agreed time present for 15 minutes with a Power Point presentation. Students are advised keeping notes during class (consultation), and exam preparation from the recommended and compulsory literature. During the lectures will be used PowerPoint presentations to help explain the contents to be discussed and debated during class.

Literature

Required reading:

1. Tolušić, Z. (2011): Tržište i distribucija poljoprivredno prehrambenih proizvoda. Grafika d.o.o. Osijek.
2. Samardžija, V. (2002): Prilagodbe politikama unutarnjeg tržišta EU, Ministarstvo za Europske integracije, Zagreb.
3. Baban, Lj. (2001): Tržište, Školska knjiga Zagreb, Zagreb.
4. Družić, I. (1997): Tranzicijska funkcija poljodjelstva, HAZU, Zagreb.
5. Goodman, D., Watts, M. J.(1997): Globalizing Food, Agrarian Questions and Global Restructuring, Routleedge, London.
6. Bratko, S. (1980): Organizacija tržišnog poslovanja, FOI Varaždin,

Varaždin.Recommended literature:

1. Meler, M. (1999): Marketing. Sveučilište J.J. Strosmayera Osijek, Ekonomski fakultet u Osijeku.
2. Previšić, J. Ozretić Došen, Đ. (2000): Osnove međunarodnog marketinga. Masmedia, Zagreb.
3. Kohls, R., Uhl, J. (1985): Marketing of Agricultural Products. Mc Millan Publisihing Company,New York.
4. Kotler, O. (1994): Upravljanje marketingom, analiza, planiranje, primjena i kontrola. Informator, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-6	Literature styling	Checking the activities was carried out through the oralconversation.
Seminars)	0.40	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to thepre-established criteria
Exam	3.80	1-6	Preparing for exam bystudying required and recommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits

1ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

20 teaching hours (lectures) = 0.80 ECTS (20 teaching hours/125 hours of total load x 100 = 16.00% from total of 5 ECTS)

10 hours of seminars = 0.40 ECTS (10 hours/125 hours of total load x 100 = 8.00% from total of 5 ECTS)

Final exam = 3.80 ECTS (95 hours of preparation/125 hours of total load x 100 = 76.00% fromtotal of 5 ECTS)

Module quality assessment

Evaluation of quality performance modules and teachers' work will be evaluated by an anonymous student surveys

After completing the study, student will be able to:

Learning Outcome 1	Interpret the anatomy and physiology of domestic animals and fish.
Learning Outcome 2	Suggest statistical methods, integrate the results after data processing, and coordinate with market research methods.
Learning Outcome 3	Suggest methods of growing monogastric and poligastric domestic animals, as well as of warm-water fish.
Learning Outcome 4	Identify and choose the newer methods and procedures of hygiene accommodation of domestic animals and hygienic-sanitary measures evaluation.
Learning Outcome 5	Recommend alternative systems of domestic animals breeding in organic production.
Learning Outcome 6	Recommend factors of animal products quality and evaluate the function of animal products for special purposes.
Learning Outcome 7	Argue the regulations in livestock production.

PIG BREEDING

2.3. Modules of postgraduate specialist study Pig Breeding

Compulsory modules:

	Module name	teaching hours	ECTS credits
1.	Specificity of Swine Physiology and Porcine Reproduction	30	10
2.	Genetics and Biometrics in Pig Production	60	10
3.	Feeding of Pigs	30	10

Elective modules:

	Module name	teaching hours	ECTS credits
1.	Pig Housing	30	10
2.	Health Care of Pigs	30	10
3.	Waste Management in Pig Breeding	30	10
4.	Organic Pig Breeding	30	10

2.3.1. Learning outcomes of postgraduate specialist study PigBreeding

Module name	**Specificity of Swine Physiology and Porcine Reproduction**	
Module coordinator	Mislav Đidara	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 20, E - 0, S - 10

Module aim

The newest knowledge about growth and maturation of swine digestive system. Estrus cycle characteristics, reproductive management of sow herds, reproductive parameters, timing of mating and artificial insemination, control of estrus, reproductive disorders, anestrus.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Distinguish between organs and tissues in the thoracic, abdominal and pelvic cavity.
2. Enumerate the structure and role of the digestive tract and reproductive organs.
3. Connect the impact of nutrition on the growth and development of gut, and the developmentof mucosal immunity.
4. Describe neurohormonal regulation of the estrous cycle.
5. Enumerate methods for diagnosis of pregnancy.
6. To identify management of the reproductive cycle.

Module content

Maturation of pigs digestive system, innervation of small intestine, roll of nitric oxide in motility and development of swine GI tract, roll of gut in feed intake, biology of newborn piglet, biology of weaned piglet. Gut immunity in piglets. Estrus cycle hormones, gonadotropin activity, artificial ovulation control, physiology of early gravidity and diagnostic of gravidity. Physiology of late gravidity, weaning mortality, postpone of weaning, activation of postweaning ovulation.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Participate in the teaching process, prepare literature and solve mathematical problems.

Literature

Required reading:

1. Gordon, I. (1997): Reproduction in Pigs. Cabi International, New York.
2. Varley, M. A., Wiseman J. (2000): The Weaner Pig. CABi Publishing, New York.
3. Zabielski, R., Gregory, B. (2003): Biology of the Intestine in Growing Animals. Elsevier HealthSciences. Philadelphia, USA.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	0.8	1-4	Studying the literature	Verification activities
Seminar	0.4	5, 6	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	8.8	1-6	Preparing for exam bystudying required literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads
20 hours lectures = 0.8 ECTS (20 hours/250 total load x100 = 8.00% from the 10 ECTS)
Seminar= 0.4 ECTS (10 hours/250 total load x100 = 4.00% from the 10 ECTS)
Final exam= 8.8 ECTS (220 hours /250 total load x 100 = 88.00% from 10 ECTS

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Genetics and Biometrics in Pig Production**	
Module coordinator	Danijela Samac	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 30, E - 15, S - 15

Module aim

To introduce the hereditary basis of pigs and breeding methods to retrieve the hereditary basis of their heritage, and thus their production characteristics. Train students in specialized studies for scientific research and publication of research results.

Terms of admission

Diploma degree

Expected learning outcomes

After completing the module, student will be able to:

1. Appoint identify and enumerate Pig Genotypes.
2. Explain Pig Genotypes, genetics of Quality and Quantity Properties of Pigs, genetic Markers inPig Breeding, gene Mapping, genetic Engineering in Pig Breeding.
3. Estimate Evaluation of Breeding Values of Pigs
4. Apply and enforce Improving Reproductive, Fattening and Slaughterhouse Properties of Pigsand Pig Breeding Programs
5. Synthesize and present methods of scientific work
6. Calculate and test the statistical significance of differences between two or more arithmeticmeans, chi - square, regression and correlation.

Module content

Pig Taxonomy and Evolution. Pig Genotypes. Genetics of Quality and Quantity Properties of Pigs. Genetic Markers in Pig Breeding. Gene Mapping. Genetic Engineering in Pig Breeding. Evaluation of Breeding Values of Pigs. Improving Reproductive, Fattening and Slaughterhouse Properties of Pigs. Pig Breeding Programs. Utilising Heterosis in Pig Breeding.Methods of Scientific Work, Selecting a Topic of a Scientific Paper, Experimental Work. Types of Scientific and Research Papers, Structure of a Scientific Paper, Preparing the Manuscript for Printing, Oral Presentation of a Scientific Paper.Testing statistical significance of differences between two or more arithmetic means in samples, chi-square, regression and correlation, experiment plans. The title of seminar paper to be determined according to participants' interest. Statistical Processing of Research Results in Pig Breeding

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Barić, S. (1965): Statističke metode primjenjene u stočarstvu. Agronomski glasnik, Zagreb.Barić, S. (1972): Metodika znanstvenih istraživanja u stočarstvu. Agronomski glasnik, Zagreb.
2. Falconer, D. S., Mackay, Trudy, F. C (1996).: Introduction to quantitative genetics. LongmanGroup. Ltd. Edinburg.
3. Knežević, I. (1988): Uvod u znanstveni rad. Poljoprivredni fakultet, Osijek. Str. 54.
4. Knežević, I., Mijić, P. (2006): Uvod u znanstveni rad. Poljoprivredni fakultet u Osijeku, Sveučilište J. J. Strossmayera u Osijeku. Str. 80.
5. McGlone, J., Pond, W. G. (2003): Pig Production: Biological Principles and Applications. Thompson Delwar Learning.
6. Rothschild, M. F., Ruvinsky, A. (1998): The Genetics of the Pig. CAB International, Cambridge.
7. Senčić, Đ., Pavičić, Ž., Bukvić, Ž (1996): Intenzivno svinjogojstvo. Nova zemlja, Osijek.
8. Snedecor, Cochrain (1988): Statistical method. Ames, Iowa.
9. Šošić, J., Serdar, V. (1992): Uvod u statistiku. Školska knjiga

Zagreb.Recommended literature:

1. Baban, Lj., Ivić, Kata, Jelinić, S., Lamza-Maronić, Maja, Šundalić, A. (2000): Primjena metodologije stručnog i znanstvenog istraživanja. Ekonomski fakultet u Osijeku, Osijek.
2. Mijić, P., Knežević, I. (2005): Uporaba Interneta u poljoprivredi. Stočarstvo, 59 (1) 71-78.
3. Silobrčić, V. (1989): Kako sastaviti i objaviti znanstveno djelo. JUMENA, Zagreb.
4. Zelenika, R. (1991): Kako nastaje recenzija znanstvenog i stručnog rada. Zavod za istraživanja irazvoj sigurnosti, Zagreb.
5. Zelenika, R. (2000): Metodologija i tehnologija izrade znanstvenog i stručnog djela. Ekonomskifakultet u Rijeci, Rijeka.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.8	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.6	1-6	Literature studying, seminar preparation andpresentation	Seminar examination and evaluation according to thepre-established criteria

Final exam	7.6	1-6	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads

45 teaching hours (lectures + exercises) = 1.8 ECTS (45 teaching hours/250 hours of total load x100 = 18.00 % from total of 10 ECTS)

Seminar paper = 0.6 ECTS (15 hours/250 hours of total load x100 = 6.00 % from total of 10 ECTS)Final exam = 7.6 ECTS (190 hours of preparation/250 hours of total load x 100 = 76.00% from total of 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Feeding of Pigs**	
Module coordinator	Matija Domaćinović	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 20, E - 10, S - 0

Module aim
To present to students of postgraduate specialist study the latest knowledge in the selection of feed materials, their preparation and use in pig nutrition.

Terms of admission
Graduate study

Expected learning outcomes
After completing the module, student will be able to:
1. Classify forage according to the nutrient value of pigs.
2. Standardize nutritional requirements of specific categories of pigs.
3. To use a computer program in composing feed mixtures for pigs.
4. Present technology of pig feeding in intensive production conditions.
5. Recommend feeding of pigs in prolonged fattening, intended for the production of durablegoods.

Module content
The importance of selecting the feed materials and their preparations in feeding of certain categories of pig. The standardization needs of different categories of pigs: Importance of ideal protein and energy in pigs feeding. Technology of nutrition of breeding pig, piglets and fattening pig. The strategy of feeding pigs. Designing quality pig meat through nutrition. Computer application in composing compound feeds for individual categories of pigs.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Make a set of practical examples of compiling recipe for certain categories of pigs. To study the recommended literature needed in the preparation of the final exam.

Literature
Required reading:

1. Domaćinović M. (1999): Praktikum vježbi hranidbe domaćih životinja. Poljoprivredni fakultet uOsijeku.
2. Domaćinović M. (2006): Hranidba domaćih životinja, Osnove hranidbe, Krmiva.,Poljoprivrednifakultet u Osijeku.

3. Domaćinović, M., Antunović, Z., Džomba, E., Opačak, A., Baban, M., Mužic, S. (2015): Specijalnahranidba domaćih životinja. Poljoprivredni fakultet u Osijeku (u tisku).

Recommended literature:

1. Jeroch, H., W. Drochner, O. Simon (1999): Ernährung landwirtschaftlicher Nutzttiere, VerlagEugen Ulmer Stuttgart.
2. Krmiva, Stočarstvo, Poljoprivreda – stručni časopis.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.2	1-5	The study of literature, calculation tasks	Checking the activities carried out through oral conversation, delivery and reviewof calculated tasks
Final exam	8.8	1-5	The study of requiredand recommended literature for exam preparation	Exam (written and oral)
Total	10			

The way of calculating ECTS credits for certain activities:
The module has 10 ECTS credits
1 ECTS point = 25 hours of workload (hours of student work)10 ECTS points = 250 hours of load modules
30 teaching hours (lectures + exercises) = 1.2 ECTS (30 teaching hours/250 hours of total load x100 = 12.00 % from total of 10 ECTS)
Final exam = 8.8 ECTS (220 hours of preparation/250 hours of total load x 100 = 88.00% from total of 10 ECTS)

Module quality assessment
The evaluation of teachers and the quality of the above described module via anonymous student surveys.

Module name	**Pig Housing**	
Module coordinator	Davor Kralik	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Elective module	
Year of studies	Secound	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 20, E - 5, S - 5

Module aim

Teaching students about the latest systems and livestock facilities as well as technical advances in ensuring good micro-climatic conditions in pig breeding.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Designe facilities in pig breeding.
2. Design a spatial plan.
3. Develop technological, conceptual and major project.

Module content

Organization and designing facilities in pig breeding, spatial planning, development of a technological, conceptual and major project. Biological and technical conditions of the environment: size of pens, boundary constructions and relation between air conditioning and insulation of the facility. Construction and technical factors: physical and construction properties of facilities in animal husbandry, heat balance. Hygienic and technical factors: production conditions in animal housing, air-conditioning and types of ventilation facilities in pig breeding, cattle raising and poultry production. Heating facilities with conventional and alternative sources of energy. Designing facilities and ventilation systems in pig breeding. Latest achievements in technical and technological systems for processing of organic mass are introduced through seminar activities.

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Biglbauer, M. (1997): Poljoprivredni objekti. Građevinski fakultet, Osijek.
2. Šikić, D. (1980): Elementi projektiranja građevinskih firmi. Poljoprivredno graditeljstvo, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.0	1-3	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-3	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	8.8	1-3	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads

25 teaching hours (lectures + exercises) = 1 ECTS (25 teaching hours/250 hours of total load x 100 =10.00 % from total of 10 ECTS)

Seminar paper = 0.2 ECTS (5 hours/250 hours of total load x 100 = 2.00 % from total of 10 ECTS)Final exam = 8.8 ECTS (220 hours of preparation/250 hours of total load x 100 = 88.00% from total of 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Health Care of Pigs**	
Module coordinator	Željko Cvetnić	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 25, E - 5, S - 0

Module aim

Participants will be shown the most common infectious, parasitic and metabolic diseases that accompany modern pig production. A special emphasis on mycotoxicosis, errors in feeding and opportunities for prevention. Options for monitoring economic losses based on pathology breeding. To familiarize the students with the source and the emergence of health problems in the intensive pig.

Terms of admission

Diploma degree

Expected learning outcomes

After completing the module, student will be able to:

1. Describe and recognize parasitic and infectious diseases of pigs.
2. Identify and specify internal disease virus.
3. Explain the basics of post-mortem time and ways of monitoring pathology herds.

Module content

Parasitic diseases of pigs: pig mange. Ascariasis, trichinosis, cysticercosis, coccidiosis, hematopinoza.

Infectious disease virus: disease caused by mycoplasma, PRRS, swine fever, a disease Aujetzki, parvovirus pigs, PRDC, ileitis, hemorrhagic gastroenteritis, eperythrozoonosis, leptospirosis, brucellosis, streptococcosis, infection by E. coli, salmonella, tuberculosis.

Internal diseases of pigs: metabolic disease virus, the consequences of errors in feeding and keeping pigs, genetic malformations, mycotoxicosis, alkaloids from plants.

Physiology of late pregnancy and childbirth, mortality of piglets, delay delivery, initiation of ovarian activity postpartum.

Types of teaching

- ☒ lectures
- ☐ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for exercises using recommended reading literature. After the lecture, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Cvetnić, S. (2002): Bakterijske i gljivične bolesti životinja. Medicinska naklada, Zagreb.

2. Cvetnić, S. (2004): Virusne bolesti životinja. Medicinska naklada, Zagreb.
3. Grabarević, Ž. (2002): Veterinarska onkologija. DSK-Falco, Zagreb.
4. The Merck Veterinary Manual (2004): ninht edition, Merck, Inc, Rahway, N. J. USA.
5. Ožegović, L., Pepeljnjak, S. (1995): Mikotoksikoze. Školska knjiga,

Zagreb.Recommended literature:

1. Diaz, D. (2005): The Mycotoxin, blue book. Nottongham University Press.
2. Forenbacher, S. (1975): Klinička patologija probave i mijene tvari domaćih životinja.JAZI i Liber,Zagreb.
3. Hajsig, D., Naglić T., Pinter LJ., Pepeljnjak, S. (2005): Veterinarska mikrobiologija, Zagreb.
4. Sloss M. W., Kemp R. L. (1978): Veterinary Clinical Parasitology. Iowa State Universitiy Press.Ames Iowa.
5. Quin, P. J., Carter, M. E. Marky, B., Carter, G. R. (2004): Clinical Veterinary Microbiology.Elsevier, Philadelphia, USA.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.2	1-3	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Final exam	8.8	1-3	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads
30 teaching hours (lectures + exercises) = 1.2 ECTS (30 teaching hours/250 hours of total load x100 = 12.00 % from total of 10 ECTS)
Final exam = 8.8 ECTS (220 hours of preparation/250 hours of total load x 100 = 88.00% from total of 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Waste Management in Pig Breeding**	
Module coordinator	Davor Kralik	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 15, E - 10, S - 5

Module aim

Introducing waste management methods in pig breeding, primarily biomass management, in order to produce energy. Topics include: biomass energy; biogas; plants for biogas production and their characteristics; using biogas in agricultural production; manure separators, methods ofmanure storing, processing and composting; impact on the environment and opportunities for savings or economic profit.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Explain Production of energy from biomass.
2. Indicate, enumerate and describe technical and technological procedures in the managementof pig manure.
3. To determine the properties of the biomass.

Module content

Biogas properties, process of anaerobic fermentation of biomass in biogas production, biogas plants, cogeneration plants (BHKW), mandatory safety measures.Technical and technological procedures in pig manure management (methods of collecting and processing manure and manure properties); composting; method of applying processed manure and slurry to arable land. Defining properties of biomass, determining the size of a biogas plant. Processing the latest knowledge about technical and technological systems for processing of organic mass through seminar work.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Baličević,I., i sur. (2001.): Agrar energija i ekologija (brošura).
2. Benčević, K. (1993) : Biokont- osnove biološkog poljodjelstva, Poslovna zajednica, Zagreb.
3. Graf, W. (1994): Biogas- Historisches, Biogas fur Osterreih, Gefordet vom Bundesministriumfur Umwelt, Jungen und Familie, Wien.
4. Đulbić, M. (1986): Biogas, dobijanje, korištenje i gradnja uređaja, Tehnička knjiga, Beograd.
5. Wienhorst, E. (1985): Landtechnik, Verlag Eugen Ulmer, Stuttgart.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.0	1-3	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-3	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	8.8	1-3	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads
25 teaching hours (lectures + exercises) = 1.0 ECTS (25 teaching hours/250 hours of total load x100 = 10.00 % from total of 10 ECTS)
Seminar paper = 0.2 ECTS (5 hours/250 hours of total load x100 = 2.00 % from total of 10 ECTS)
Final exam = 8.8 ECTS (220 hours of preparation/250 hours of total load x 100 = 88.00% from total of 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Organic Pig Breeding**	
Module coordinator	Danijela Samac	
Study programme	Postgraduate specialist study Pig Breeding	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 20, E - 0, S - 10

Module aim
Present organic methods of pork production to participants.

Terms of admission
Diploma degree

Expected learning outcomes
After completing the module, student will be able to:
1. Analyze the regulations in organic farming.
2. Describe and identify environmentally accommodation of certain categories of pigs.
3. Conduct and recommend ecological feeding pigs.
4. Conduct ecological disposal of animal waste.
5. Explain to recognize the quality of organic products in pig breeding.

Module content
Analysis of regulations in organic farming. Organic housing for particular categories of pigs. Organic feeding of pigs. Proper management of animal waste. Quality of organic products in pig breeding.The theme and name of seminar work to be determined according to participants' interest

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Rahmann, G. (2004): Ökologische Tierhaltung. Verlag Eugen Ulmer, Stuttgart.
2. Senčić, Đ., Antunović, Z. (2003): Ekološko stočarstvo. Katava d.o.o., Osijek.
3. Senčić, Đ., Antunović, Z., Mijić, P., Baban, M., Puškadija, Z. (2011): Ekološka zootehnika . Osijek,Poljoprivredni fakultetu u Osijeku.

Recommended literature:

1. Benčević, K. (1993): „Biokont- osnove biološkog poljodjelstva». Poslovna zajednica za stočarstvo, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.8	1-5	Literature studying	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.4	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	8.8	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads

20 teaching hours (lectures + exercises) = 0.8 ECTS (20 teaching hours/250 hours of total load x100 = 8.00 % from total of 10 ECTS)

Seminar paper = 0.4 ECTS (10 hours/250 hours of total load x100 = 4.00 % from total of 10 ECTS)Final exam = 8.8 ECTS (220 hours of preparation/250 hours of total load x 100 = 88.00% from total of 10 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

After completing the study, student will be able to:

Learning Outcome 1	Know the characteristics of physiological processes of pig digestion and reproduction
Learning Outcome 2	Apply the genetics of qualitative and quantitative properties and methods of scientific work and publish the results of scientific research
Learning Outcome 3	Standardize nutritional requirements of pigs, and recommend feeding for certain pig categories
Learning Outcome 4	Develop a spatial plan and design facilities in pig breeding
Learning Outcome 5	Identify parasitic, infectious and internal diseases of pigs
Learning Outcome 6	Organize technical and technological procedures in pig manure management
Learning Outcome 7	Analyse and implement bylaws in organic agriculture

FARM MANAGEMENT

2.4. Modules of postgraduate specialist study Farm Management

Compulsory modules:

	Module name	teaching hours	ECTS credits
1.	Economics of Agricultural Resources	50	7
2.	Management Strategies for Small and Medium Farms	55	8
3.	Planning and Projecting on Agricultural Economy	55	8
4.	Agroindustrial Marketing	50	7

Elective modules:

	Module name	teaching hours	ECTS credits
1.	Introduction to Scientific Work	45	5
2.	Policy of Agrarian Structure	45	5
3.	Regional Importance of Agricultural Production	45	5
4.	Quantitative Methods for Economic Analysis	45	5
5.	Competitiveness of the National Economy	45	5
6.	Information Systems in Agriculture	45	5
7.	Entrepreneurship and Entrepreneurial Skills	45	5
8.	Agromarketing Management	45	5
9.	Organizational Behavior in Agriculture	45	5
10.	Human Resource Management	45	5
11.	Financial Management in Agriculture	45	5
12.	Cost Management	45	5

2.4.1. Learning outcomes of postgraduate specialist study FarmManagement

Module name	**Economics of Agricultural Resources**	
Module coordinator	Krunoslav Zmaić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	7
	Lecture hours (L+E+S)	L - 35, E - 0, S - 15

Module aim

Introduce postgraduates with opportunities of exploiting agricultural resources and their allocation through descriptional relationship and interdependence between different ecosystems in managing of farms.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Synthesize and apply economics theory of production resources and macroeconomic development.
2. Assess and evaluate production resources and changes in technology.
3. Rank and compare indicators of supply and demand and other external and internal environment to agricultural resources.
4. Identify and choose the newer methods and procedures in the theory of active and retoaktivnih rings through agricultural and economic development.
5. Valorise competitive advantage on the basis of production and resources, and product andprice.

Module content

The economic theory of production resources, theory of macroeconomic development, production resources and production function, distribution of resources, theory of active and retroactive rings through agricultural and economic development, productional resources and technology and technological changes to the quantitative and qualitative characteristics, integration fairness and resource shares.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are present in lectures and in making of seminar work, in which a student on a specific research project deals with teaching units from lectures to the extent required by seminar paper.

Monitoring of the seminar work is ongoing, as well as verification of acquired knowledge, by public defense of the seminar paper and by oral exam ends knowledge verification.

Literature

Required reading:

1. Ferenčak, I. (1998): Počela ekonomije, Ekonomski fakultet u Osijeku, Osijek.
2. Samuleson, P.A., Nordhaus, W. (2000): Ekonomija, Mate, Zagreb.
3. Cambell, R., McConnell & Stanley, L. Brue (1994): Suvremena ekonomija rada,

Mate.Recommended literature:

1. Parkin, M. (1990): Economics, Addison-Wesley Publishing Company, New York.
2. Dyal, A. J., Karatjas, N. (1985): Basic Economics, McMillan Publishing Company, New York.
3. Yair Mundlak (2000): Agriculture and Economic Growth, Harvard University Press Cambridge,Massachusetts, London, England.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.4	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.6	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Individual work and literature studying	2.4	1-5	Literature studying, individual assignemts	Checking student activity orally (conversation), reviewing student's work and assignments
Final exam	2.6	1-5	Preparing for exam bystudying required and recommended literature	Oral exam
Total	7.0			

The way of calculating ECTS credits for certain activities:
Module carries 7 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)7 ECTS credits = 175 hours of module loads
35 teaching hours (lectures + exercises) = 1.40 ECTS (35 teaching hours/175 hours of total load x100 = 20.00% from total of 7 ECTS)
Seminar paper = 0.60 ECTS (15 hours/175 hours of total load x100 = 9.00% from total of 7 ECTS) Individual work and literature studying = 2.40 ECTS (60 hours of individual work/175 hours of total load x 100 = 34.28% from total of 7 ECTS)
Final exam = 2.60 ECTS (65 hours of preparation/175 hours of total load x 100 = 37.14% from total of 7 ECTS)

Module quality assessment
It is envisaged evaluation by students, lecturers on study and by experts in the field of study, andif necessary international supervision.

Module name	**Management strategies for small and medium farms**	
Module coordinator	Jadranka Deže	
Study programme	Postgraduate specialist study Farm Management	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	8
	Lecture hours (L+E+S)	L - 35, E - 0, S - 20

Module aim

Developing knowledge assumption of a continuous learning process, learning to actual business situations farms acquire the skills of strategic management as a result of open discussion on options to improve the management of small and medium farms.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Plan strategies, make good strategic decisions based on methodological procedures of strategic decision making.
2. Generate comparative advantages resources of the farm and spot weaknesses and risks in business.
3. Choosing potentially the best management strategies for small and medium farms.
4. Organize, manage and control the processes of practical implementation of various forms of strategy.
5. Evaluate the effects of the implementation of management strategies for small and medium farms.
6. Recommend an innovative form of development strategy for small and medium farm in theeconomy of knowledge.

Module content

The aim and objectives of the strategy; directing the planning, creation of a framework for plans, needs planning and decision making: operational, tactical and strategic; effects on all areas of management. The strategic planning process, strategic decisions of top management, TOWS matrix: a modern tool for analyzing business situations, matrix portfolio: a tool for allocating resources economy. Porter's model of competitive advantages in strategic planning and management, effective implementation strategies. Failures in the implementation of management strategies of small and medium-sized farms and some recommendations to reducethe impact on the business.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are obliged to attend lectures. While listening to the modules in consultation with the lecturer agree on the topic of seminar work. Written seminar should be made available for review, and it independently represent. After that, students take written and oral final exam.

Literature

Required reading:

1. Deže, J. i sur. (2008): Agroekonomika – priručnik. Poljoprivredni fakultet Osijek i Osječko-baranjska županija, Osijek.
2. Buble, M., Cingula, M., Dujanić, M., Dulčič Ž., Božac, M. G., Galetić, L., Ljubić, F., Pfeifer, S.,Tipurić, D (2005): Strateški menadžment. Sinergija Zagreb, str. 105-235.
3. Olson D. K (2004) Farm Management, Principles and Strategies, Iowa State Press a BlackwellPublishing Company, pp 22-64.
4. Kolaković, M. (2006): Poduzetništvo u ekonomiji znanja, Sinergija, Zagreb, str. 121-

151.Recommended literature:

1. Hisrich R. D. Peters, M. P. Shepherd, D. A. (2008): Poduzetništvo. Sedmo izdanje. MATE, Zagreb.
2. Kay R. D., Edwards W. M., Duffy, P. A (2008): Farm Management Sixth Edition, McGraw – HillInternational Edition.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.4	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.8	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	5.8	1-6	Preparing for exam by studying required and recommended literature	Oral exam
Total	8.0			

The way of calculating ECTS credits for certain activities:

Module carries 8 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)8 ECTS credits = 200 hours of module loads
35 lectures teaching hours = 1.4 ECTS (35 teaching hours/200 hours of total load x 100 = 17.50% from total of 8 ECTS)
Seminar paper = 0.8 ECTS (20 hours/200 hours of total load x 100 = 10.00% from total of 8 ECTS)Final exam = 5.8 ECTS (145 hours of preparation/200 hours of total load x 100 = 72.50% from total of 8 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Planning and Projecting on Agricultural Economy**	
Module coordinator	Ljubica Ranogajec	
Study programme	Postgraduate specialist study Farm Management	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	8
	Lecture hours (L+E+S)	L - 35, E - 10, S - 10

Module aim

Conducting internal changes and adapting the use of available capacity. Production managementin the changing conditions of the open market, uncertainty and risk with the aim of creating successfully farm business.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Analyze the impact of external and internal factors on the results achieved in agricultural production.
2. Calculate the cost of materials and labour and results of basic production lines.
3. Research the competitiveness of domestic production lines and planning of optimal structure.
4. Compile feasibility study of acquisition of fixed asssets.
5. Recommend organizational and economic measures to improve business results.
6. Evaluate economic business performance.

Module content

Size and equipment of family farms, organizational arrangement of the estate and completeness of the economic yard. Vallue, structure and functional ability of fixed assets. Intellectual capital. Course of production and the level of investment per unit, break-even point of the main line of production, analysis of the external condition impact on business results. Conducting internal changes and business adjustment in conditions of uncertainty and risk. Designing organizational structures and business functions, implementation and monitoring of the projected results. Market prerequisite of production, planning of consumprion of raw materials, auxiliary materials, consumprion of human labour and machinery, technological production process and the required number of people. Calculating the cost price. Risk assessment and sensitivity analysis. The budget justification of investment in acquisiton of basic assets.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are obliged to attend lectures and exercises. During the module duration, students and module coordinator will determine the topic of seminar. The seminar should be brought for review, after which an individual presentation should be performed. After that, students

can take written and oral final exam.

Literature

Required reading:

1. Sikavica, P (2011): Organizacija, Školska knjiga, Zagreb.
2. Sikavica, P., Hunjet, T., Ređep Begičević, N., Hernaus, T. (2014): Poslovno odlučivanje, Školskaknjiga Zagreb.
3. Bendeković, J. i sur. (2007): Priprema i ocjena investicijskih projekata, FOIP, Zagreb.
4. Osmanagić Bedenik, N. (2002): Operativno planiranje, Školska knjiga, Zagreb.
5. Orsag, S., Dedi, L (2011): Budžetiranje kapitala, Procjena investicijskih projekata, II. proširenoizdanje, Masmedia, Zagreb.
6. Olson, D. K (2004) Farm Management, Principles and Strategies, Iowa State Press a BlackwellPublishing Company.
7. Weihrich, H., Koontz, H. (1994): Menedžment, deseto izdanje, MATE d.o.o., Zagreb.
8. Osmanagić Bedenik, N. i sur. (2010): Kontroling između profita i održivog razvoja, MEP Consult, Zagreb.

Recommended literature:

1. Osmanagić Bedenik, N. (2002): Operativno planiranje, Školska knjiga, Zagreb.
2. Bebić, M. (2011): Potpore i javni natječaji iz EU fondova, NOVA knjiga, RAST, Zagreb.
3. Busse, F. J. (2003): Grundlagen der betrieblichen Finanzwirtschaht 5.Auflage OldenbourgWissenschaftsverlag Gbh, Muenchen.
4. Horne, M. G. (2009): Vodič za upravljanje projektima, Dva&Dva, Zagreb.
5. Program ruralnog razvoja Republike Hrvatske za razdoblje 2014. - 2020. Ministarstvo poljoprivrede.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.8	1-6	Literature studying, assignment work	Reviewing student's work and assignments
Seminar	0.4	1-6	Literature studying, seminar preparation and presentation	Evaluation of seminar
Final exam	5.8	1-6	Preparation for the exam bystudying the required and recommended literature	Written and oral final exam
Total	8.00			

The way of calculating ECTS credits for certain activities:

Module carries 8 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)8 ECTS credits = 200 hours of module loads
35 teaching hours (lectures) = 1.4 ECTS (35 teaching hours/200 hours of total load × 100 = 17.5% from total of 8 ECTS)
Seminar = 0.4 ECTS (10 hours/200 hours of total load × 100 = 5% from total of 8 ECTS)
Exercise = 0.4 ECTS (10 hours/200 hours of total load × 100 = 5% from total of 8 ECTS)
Final exam = 5.8 ECTS (145 hours/200 hours of total load × 100 = 72.5% from total of 8 ECTS)

Module quality assessment

The quality and effectiveness of module is going to be carried by teachers and experts in the fieldof the study, if necessary, international supervisors will be involved in the process.

Module name	**Agroindustrial Marketing**	
Module coordinator	Zdravko Tolušić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	7
	Lecture hours (L+E+S)	L - 30, E - 0, S - 20

Module aim

Introduce students to the possibilities of using skills of agomarketing management in the creationand introduction of new products on the market.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe the specifics of the market poljoprivvrednih products and food markets.
2. Notice problems that occur in the market of agricultural products in each stage of the life cycleof agricultural product.
3. Clarify the behavior of consumers in the food market.
4. Conduct segmentation and selection of target markets agro-industrial activities.
5. Demonstrate the importance of promoting the entry and / or retention in a particular market. 6.Upotrijebiti market research methods to solve problems and gathering data / information on the selected market segment.
7. Determine possible marketing strategies of action.
8. Present selected marketing strategy performance in the market for a specific product group.

Module content

Preliminary considerations (specificity of food production as a separate economic activity, the importance of food in the micro and macro level). Market agroindustriskih products (supply, demand, consumption). Consumer behavior (model of consumer behavior, the main factors that influence consumer behavior, decision making process when buying). Marketing process in agribusiness (the term, the specifics of marketing in agribusiness, segmentation and selection oftarget markets, differentiate and positioning of marketing suply). The information system in agromarketing. Marketing mix. Marketing control (annual plan control, control performance, control profitability). Marketing in Croatian agribusiness.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☒ mentoring
- ☒ other

Student requirements

All students are required to attend minimum 50% of the classes. Students should be prepared for discussion and solving practical tasks using relevant literature. Students should write mandatory seminar. Seminars will be presented orally, with Power Point program and its

duration

should not be longer than 20 minutes. Schedule of oral presentations will be agreed in advance. Seminar is precondition for attending oral exams.

Literature

Required reading:

1. Kotler, P. (1994): Marketing management, Informator, Zagreb.
2. Leko-Šimić, M. (2002): Marketing hrane, Ekonomski fakultet u Osijeku, Osijek.
3. Marshall, K. P. (1996): Marketing information system, Boyd-Faser.
4. Vranešević, T., Vignali, C. i Vrontis, D. (2004): Upravljanje strateškim marketingom, Accent,Zagreb.
5. Tracy, M. (2000): Hrana i poljoprivreda u tržišnom gospodarstvu, Mate,

Zagreb.Recommended literature:

1. Baban, Lj. (1991): Tržište, 2. i dopunjeno izdanje, Školska knjiga, Zagreb.
2. Babović, J., Lazić, B., Malešević, M. i Gajić, Ž. (2005): Agrobiznis u ekološkoj proizvodnji hrane,Naučni institut za ratarstvo i povrtarstvo Novi Sad, Novi Sad.
3. Kolega, A. (1994): Tržništvo poljodjelskih proizvoda, Globus, Zagreb.
4. Padberg, D. I. et al. (1997): Agro-food marketing, CAB International, V. Britanija.
5. Samuelson, P. i Nordhaus, W. (1992): Ekonomija, MATE Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.2	1-8	Participation in the debate expressing opinions	Attendance of the classes frequency and involvement into discussion
Analysis of casestudies	0.8	1-8	Presentation, discussion	Frequency and involvement into discussion, solved tasks
Seminar	0.8	1-8	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to thepre-established criteria
Final exam (oral)	4.2	1-8	Preparing for exam bystudying required andrecommended literature	Exam-presenting facts, argumenting,analysing case studies
Total	7.0			

The way of calculating ECTS credits for certain activities:
Module carries 7 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)7 ECTS credits = 175 hours of module loads
30 teaching hours (lectures) = 1.2 ECTS (30 teaching hours/175 hours of total load x100 = 17.14 % from total of 7 ECTS)
Analysis of case studies = 0.,8 ECTS (20 hours of preparation / 175 hours of total load x 100 = 11.3% from total of 7 ECTS)
Seminar paper = 0.8 ECTS (20 hours of preparation/175 hours of total load x100 = 11.43 % from total of 7 ECTS)
Oral exam = 4.2 ECTS (105 hours of preparation/175 hours of total load x 100 = 60.00% from total of 7 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Introduction to Scientific Work**	
Module coordinator	Pero Mijić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 25

Module aim

The aim of this module is to introduce the postgraduate students to the basic principles of the scientific research, including the composition and publication procedures.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Apply the scientific method to the example of his own research.
2. Set scientific hypotheses and objectives of the work.
3. Conduct and write your own scientific work at the predicted structure of scientific work.
4. Own devise a current scientific topic and present a seminar paper.
5. Apply the computer in scientific research, and analyze the collected scientific papers.
6. Critically evaluate the scientific and professional work, and klasifikicirati used literature.

Module content

The module combines recognising, treatment and prophylaxis of the most important farm animal diseases with recognising the aspects of welfare. Students will gain necessary theoretical knowledge as an addition to knowledge from graduate studies, accompanied with seminar work and visiting an animal husbandry together with self estimation of the aspects of health protectionand animal welfare.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students are obliged to prepare for seminars and practice using recommended literature. Students prepare a seminar work that is mandatory and which will be presented orally for about 20 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that, students take part Written exam of topics Exercises. The laying of the exercises, students acquire the right exit to the oral exam from the lecture topics. Students are advised to prepare exams from the successful exam.

Literature

Required reading:

1. Knežević, I., Mijić, P. (2006): Uvod u znanstveni rad – drugo, dopunjeno i izmjenjeno izdanje.Poljoprivredni fakultet u Osijeku, Sveučilište J. J. Strossmayera u Osijeku.
2. Knežević, I. (1988): Uvod u znanstveni rad. Poljoprivredni fakultet, Osijek. Str.

54.Recommended literature:

1. Mijić, P., Knežević, I. (2005): Uporaba Interneta u poljoprivredi. Stočarstvo, 59 (1) 71-78
2. Zelenika, R. (2000): Metodologija i tehnologija izrade znanstvenog i stručnog djela. Četvrtoizdanje. Ekonomski fakultet u Rijeci.
3. Baban, Lj., Ivić, Kata, Jelinić, S., Lamza-Maronić, Maja, Šundalić, A. (2000): Primjena metodologije stručnog i znanstvenog istraživanja. Ekonomski fakultet u Osijeku, Osijek.
4. Zelenika, R. (1991): Kako nastaje recenzija znanstvenog i stručnog rada. Zavod za istraživanja irazvoj sigurnosti, Zagreb
5. Silobrčić, V. (1989): Kako sastaviti i objaviti znanstveno djelo. Drugo izdanje. JUMENA, Zagreb.
6. Žugaj, M. (1989): Osnovi znanstvenog i stručnog rada. «Zagreb» r. o. za grafičku djelatnost,Samobor

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	0.80	1-6	Studying literature, assignments	Checking the activities carried out through oral conversation, delivery and review assignments made
Seminar	1.00	1-6	The study of literature, preparation, and presentation of seminars	Review and evaluation of the seminar work according to pre-established criteria
Final exam	3.20	1-6	Preparation for the examby studying recommended literature	Oral examination
Total	5.00			

The way of calculating ECTS credits for certain activities:

The module has 5 ECTS credits
1 ECTS point = 25 hours of workload (hours of student work)5 ECTS = 125 hours of load modules
20 hours of instruction (lectures) = 0.80 ECTS (20 teaching hours /125 hours total load x 100 = 16% of the total 5 ECTS)
Seminar = 1.00 ECTS (25 hours/125 hours total load x100 = 20% of the total 5 ECTS)
Final exam = 3.20 ECTS (80 hours preparation/125 hours of total work hours x 100 = 64% of the total 5 ECTS)

Module quality assessment

The evaluation of teachers and the quality of the above modules via anonymous student surveys.

Module name	**Policy of Agrarian Structure**	
Module coordinator	Tihana Sudarić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

Introduce postgraduates with basic economic and socio-psychological elements of policy of agricultural structure, and with the strategy of macro economic, business consolidation (economics of scale) in terms of fragmented agricultural structure.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify the concepts and forms of agricultural structure.
2. Synthesize, apply and evaluate business connections in rural areas.
3. Identify strategy development and management models of agricultural resources.
4. Analyze the characteristics of the cooperative organization through legislation and case study analysis.
5. Evaluate the effects of agricultural policy measures on agrarian structure.

Module content

Concept and types of agrarian structure, models of transformation of agricultural holdings, term of system and economic structure, strategy and global measures for the consolidation of agrarian structure with emphasis on theory and the role of co-operative organization, economics strategies of existing consolidation on the principles of economics of scale, and other forms of strategic alliances.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are present in lectures and in making of seminar work, in which a student on a specific research project deals with teaching units from lectures to the extent required by seminar paper. Monitoring of the seminar work is ongoing, as well as verification of acquired knowledge, by public defense of the seminar paper and by oral exam ends knowledge verification.

Literature

Required reading:

1. Mataga, Ž. (2009): Etičke vrijednosti i gospodarski značaj zadrugarstva, Golden, Zagreb.

2. Siropolis, C. N. (1995): Menadžment malog poduzeća, Zagreb.

3. Derado, D., Grubišić, D., Mrnjavac, Ž., Pašalić, Ž., Vidučić, Lj. (2000): Lokalni sustavi malih poduzeća – mogući pristup restruktuiranju gospodarstva i regionalnom razvitku, Ekonomski fakultet, Split.
4. Petrač, B. (2002): Agrarna ekonomika, Sveučilišni udžbenik, Ekonomski fakultet u Osijeku, Osijek.
5. Zadrugarstvo na pragu novog tisućljeća (2000): Urednik Branko Žalac, HZS,

Zagreb.Recommended literature:

1. Mataga, Ž. (1991): Poljoprivredno zadrugarstvo Hrvatske, Zagreb.
2. Stacy, D. R. (1997): Strateški menedžment i organizacijska dinamika – odabrana poglavlja, Zagreb.
3. Defilippis, J. (2002): Ekonomika poljoprivrede, Školska knjiga, Zagreb.
4. Yair Levi: Globalization and the cooperative difference, Journal of Rural Cooperation, 29(2),2001: 105-114.
5. Helmberger, G. P. (1991) Economic Analysis of Farm Programs, University of Wisconsin, McGraw-Hill, Inc., USA.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.20	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work andassignments
Seminar	0.60	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	3.20	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 teaching hours (lectures + exercises) = 1.20 ECTS (30 teaching hours/125 hours of total load x100 = 24.00% from total of 5 ECTS)
Seminar paper = 0.60 ECTS (15 hours/125 hours of total load x100 = 12.00% from total of 5 ECTS)Final exam = 3.20 ECTS (80 hours of preparation/125 hours of total load x 100 = 64.00% from total of 5 ECTS)

Module quality assessment
It is envisaged evaluation by students, lecturers on study and by experts in the field of study, andif necessary international supervision.

Module name	**Regional Importance of Agricultural Production**	
Module coordinator	Snježana Tolić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

Introduce postgraduates with the fundamental regional characteristics of agriculture and the rural economy through cluster analysis and statistics regionalization approach in the context of integrated development of the region.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. To analyze the geographic, climatic and ecological characteristics of the development ofagriculture and agro-environmental system.
2. Identify and evaluate a variety of revenue opportunities in agriculture and diversified ruraleconomy.
3. Use of economic, social and environmental indicators for sustainable agricultural production.
4. Implement criteria regional particularities multifunctional paradigm of rural development inthe planning of development processes.
5. To assess regional potential of agriculture to the NUTS classification EU region.
6. Evaluate the potential financial effects of the optimized model of agricultural development forentrepreneurs and the general good.
7. To create agricultural development strategy of local and regional importance.

Module content

Theoretical and methodological bases for regional and rural development, regional distribution of agriculture in terms of commodity exchange, the criteria for distribution of agricultural production, EU regional policy and kritetiji NUTS, economic growth and the expected changes in the regional economic structure, rurality and indicators of rurality, economic, environmental and social a rural structure, integrated rural development and the role of local actors, the revitalization of rural areas.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are present in lectures and seminar work in which a student on a specific research project deals with teaching units with lectures to the extent required research paper. Monitoring

of the seminar work is ongoing, as well as checking the acquired knowledge, and public defenseof the seminar paper and oral exam ends assessment.

Literature

Required reading:

1. Agronomski fakultet Sveučilište u Zagrebu, MPŠ, VIP (2001): Regionalizacija poljoprivrede,Zagreb.
2. Ministarstvo poljoprivrede RH (2014): Program ruralnog razvoja Republike Hrvatske za razdoblje 2014.-2020.
a (2003): The Mid-term Review and CAP Reform, London.
3. Bogunović, A. (1991): Regionalna ekonomika, Narodne novine, Zagreb.
4. Grahovac, P. (2005): Ekonomika poljoprivrede, Golden marketing-Tehnička knjiga, Zagreb.
5. Defilipis, J. (2002) Ekonomika poljoprivrede, Školska knjiga, Zagreb.
6. Marsden, T., Sonnino, R. (2008): Rural development and the regional state: Denying multifunctional agriculture in the UK
Zagreb.

Recommended literature:

1. Marsden, T., Sonnino R. (2008): Rural development and the regional state: Denying multifunctional agriculture in the UK. Journal of Rural Studies 24 (2008) 422–431.
2. Defilippis, J. (1993): Obiteljska gospodarstva Hrvatske, AGM, Zagreb.
3. Mazzocchi, M., Montresor, E. (2003): Agricultural and Rural Development at Regional Level: AnAnalytical Approach, Bruxelles.
4. Europska komisija (2003): Rural development in the Europen Union.
5. Ekonomski institut Zagreb (1999): Koncepcija regionalnoga gospodarskog razvitka RepublikeHrvatske, Ekonomski institut, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.8	1-7	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	1.00	1-7	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Independent work and studying	2.40	1-7	The study of literature, individualtasks	Checking the activities carried out through oral conversation, delivery and review made assignments
Final exam	0.80	1-7	Preparing for exam bystudying required andrecommended literature	Oral exam
Total	5.0			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)5 ECTS credits = 125 hours of module loads
20 lectures teaching hours = 0.80 ECTS (20 teaching hours/125 hours of total load x 100 = 16.00% from total of 5 ECTS)
Seminar paper = 1.00 ECTS (25 hours/125 hours of total load x 100 = 20.00% from total of 5 ECTS) Independent work and studying = 2.4 ECTS (60 hours/125 hours of total load x 100 = 48.00% fromtotal of 5 ECTS)
Final exam = 0.80 ECTS (20 hours of preparation/125 hours of total load x 100 = 16.00% from total of 5 ECTS)

Module quality assessment
It is planned evaluation by students, teachers and experts to study in the field of study, and if necessary international supervision.

Module name	**Quantitative Methods for Economic Analysis**	
Module coordinator	Igor Kralik	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 20, E - 0, S - 25

Module aim

To introduce students to the basic quantitative methods used in the economic analysis. The observation methods will be studied in concrete practices such as production planning, productrange, sales, purchasing, marketing and transportation.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Explain and define operational research.
2. Identify methods of operations research necessary for economic analysis.
3. Apply Simplex method of linear programming.
4. Apply Gomory method of integer programming.
5. Compare and evaluate the selection of strategies in game theory.

Module content

Linear programming. Integer programming. Analysis of the data in the operational research. Game theory.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are expected to actively participate during class (consultation). All students are obliged to prepare are for seminars. Writing the seminars is obligatory. Seminar is a review article on a given topic, who will the student in advance agreed time present for 15 minutes with a Power Point presentation. Students are advised keeping notes during class (consultation), and exam preparation from the recommended and compulsory literature. During the lectures will be used PowerPoint presentations to help explain the contents to be discussed and debated during class.

Literature

Required reading:

1. Barković, D. (2010): Operacijska istraživanja, drugo izdanje, Sveučilište u Osijeku, Osijek.
2. Neralić, L. (2003): Uvod u matematičko programiranje 1, Element, Zagreb.

Recommended literature:

1. Scitovski, R. (2012): Kvantitativne metode za poslovno odlučivanje, nastavni materijali, Odjelza matematiku.
2. Render, B. et. al. (2003): Quantitative Analysis for Management. 8th Edit. Prentice Hall. NewYork.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.80	1-5	Literature styding	Checking the activities was carried out throughthe oral conversation.
Seminars)	1.00	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Exam	3.20	1-5	Preparing for exam bystudying required andrecommended literature	Oral exam
Total	5.00			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
20 teaching hours (lectures) = 0.80 ECTS (20 teaching hours/125 hours of total load x 100 = 16.00% from total of 5 ECTS)
25 hours of seminars = 1 ECTS (25 hours/125 hours of total load x 100 = 20.00% from total of 5 ECTS)
Final exam = 3.20 ECTS (80 hours of preparation/125 hours of total load x 100 = 64.00% from total of 5 ECTS)

Module quality assessment

Evaluation of quality performance modules and teachers' work will be evaluated by an anonymous student surveys.

Module name	**Competitiveness of the National Economy**	
Module coordinator	Tihana Sudarić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

Introduce postgraduates with agroeconomic problems (allocation, distribution, stabilization), and the mechanisms of the free market and the possibilities of exploiting comparative and competitive advantages.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Assess and evaluate models of transformation in agriculture.
2. Identify and analyze sectoral policies in national and international frameworks.
3. Evaluate the comparative and competitive advantages of the national economy.
4. Define the importance of investment in research and prodouction development.
5. Create a PAM matrix and DCR ratios for increasing the competitiveness of the nationaleconomy.

Module content

Similarities and differences between the basic models of transformation of agriculture, the experience of countries with developed market economy in directing farm production, agrocomplex problems and its integration into the processes of transition, competitiveness of the Croatian agriculture through structural constraints, problems of sectoral policies, mokroekonomskim factors, the importance of investing in research and development of production (R & D), concept of effective rates of protection, the concept of effective exchange rate, making of PAM matrix and DCR ratio for calculating the competitive indicators, and workflow of measures and rational expectations in the development of farms.

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are present in lectures and in making of seminar work, in which a student on a specific research project deals with teaching units from lectures to the extent required by seminar paper. Monitoring of the seminar work is ongoing, as well as verification of acquired knowledge, by public defense of the seminar paper and by oral exam ends knowledge verification.

Literature

Required reading:

1. Piketty, T. (2014): Kapital u 21.stoljeću, Profil, Zagreb.
2. Tipurić, D. (1999): Konkurentska sposobnost poduzeća, Sinergija, Zagreb.
3. Ghatak, S., Ingerstent, K. (1984) Agriculture and Economic Develpoment, Whawatsheaf BooksLtd, Brighton, Sussex.
4. Trasy, M. (1982) Agriculture in Western Europe, Challenge and Resource, Grande,

London.Recommended literature:

1. 55 preporuka za povećanje konkurentnosti Hrvatske (2004): Nacionalno vijeće za konkurentnost, Zagreb.
2. Harwood I. J., Vailey W. K. (1994) The World Market, Goverment Intervention and MultilateralPolicy Reform, U. S. D. A, Washington, USA.
3. Helmberger, G. P. (1991) Economic Analysis of Farm Programs, University of Wisconsin, McGraw-Hill, Inc., USA.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	1.2	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.6	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	3.2	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 lectures teaching hours = 1.2 ECTS (30 teaching hours/125 hours of total load x 100 = 24% from total of 5 ECTS)
Seminar paper = 0.6 ECTS (15 hours/125 hours of total load x 100 = 12% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours of preparation/125 hours of total load x 100 = 64% from total of 5 ECTS)

Module quality assessment

It is envisaged evaluation by students, lecturers on study and by experts in the field of study, andif necessary international supervision.

Module name	**Information Systems in Agriculture**	
Module coordinator	Davorin Turkalj	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

The goal is to develop students' ability to collect, understand and process the data and information necessary for management of business process in the agricultural enterprise. Using the appropriate ICT tools, students should develop skills for the effective use of information systems, and to understand its structure and architecture and implementation problems as well.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Distinguish basic terms of information systems in agriculture.
2. Explain the importance of information management in modern business systems.
3. Distinguish isolated examples of ERP systems.
4. Compare the basic search techniques of Internet information space.
5. Describe the specificity and importance of knowledge management systems in agriculture.
6. Compare examples of systems for timely information in agriculture.

Module content

Basic concepts of information systems; role of information systems in the management of business information systems, information technology to greater productivity and efficiency, information system of agrarian business system through the structure and architecture of modern information systems. IS, business functions and business processes. IS and decision-support systems management in agriculture. IS system and business process management, events and cycles, Integrated information systems and ERP systems: Business processes of agrarian business system. Which covers ERP. Important subsystems: SCM - logistics and distribution systems, CRM - customer relationship management, modeling, design and construction of information system in agriculture, external information systems in agriculture: Geographic Information Systems; Information systems of supply and demand of agricultural products. Ecological Information Systems. Systems for control and prevention of disasters in the agricultural production. Metoeorološki information systems. IS legislation in agriculture, incentives, standards. Information systems for the prevention and treatment of diseases in agriculture. IS agrarian development and technological progress. Connect internal business information systems and external systems in agriculture. implementation of business informationsystems in agriculture, problems and solutions. Benchmarks. Case study analysis.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☒ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☒ mentoring
☐ field work	☐ other

Student requirements

Students are required to prepare for seminars and lectures using recommended literature. Students prepare a seminar work that is required. Seminar students present orally for about 15 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that students take to the final exam. Students are advised to prepare exams from mandatory literature.

Literature

Required reading:

1. Ceric, V., Varga, M., Birolla, H. (1998): Business Computing, sign, Zagreb, (only chapters II andIII, pp. 29-150)
2. Croatia in the 21st century, the Development Strategy of the Republic of Croatian, Agricultureand Fisheries http://www.hrvatska21.hr/prehrana_polj_i_rib%2010_6_2002.pdf.,
3. Information system of supply and demand of agricultural products, http://www.tisup.mps.hr/hr/default.asp
http://www.hr/wwwhr/business/agriculture/index.hr.html

Recommended literature:

1. Morgan, T. (2002): Business Rules and Information Systems: Aligning IT with Business Goals,Addison-Wesley
2. Cassidy, A. Practical Guide to Information System Strategic Planning,
3. Geographic Information Systems in Business (Hardcover) Publisher: Idea Group Publishing(August 1, 2004).

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	1.2	1-6	The study of literature, participation in class	Monitoring activities by talking to students
Seminar	0.6	1-6	Work on the project task, making presentations .pptx	Evaluation of project assignment and presentation through predefined criteria
Final exam	3.2	1-6	Preparation for the exam with the agreed conditions	Oral exam
Total	5.0			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)5 ECTS credits = 125 hours of module loads
30 lectures teaching hours = 1.2 ECTS (30 teaching hours/125 hours of total load x 100 = 24% from total of 5 ECTS)
Seminar paper = 0.6 ECTS (15 hours/125 hours of total load x 100 = 12% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours of preparation/125 hours of total load x 100 = 64% from total of5 ECTS)

Module quality assessment
Assesment is carried out by students, teachers and experts in the field of study, and if necessaryinternational supervision.

Module name	**Entrepreneurship and Entrepreneurial Skills**	
Module coordinator	Jadranka Deže	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

Developing the ability to apply entrepreneurial behavior based on acquired expertise and knowledge of current business situation in which it is possible to apply entrepreneurship. Entrepreneurial skills are essential to the process of entrepreneurship started, and what is more important and held. Therefore, it is necessary to allow students access to access to relevant information. Familiarize them with procedures of applying entrepreneurial skills in making quality business decisions. How to manage businesses, collaborate with complementary institutions, skills in business decision making, how entrepreneurial skills to achieve better motivation, higherproductivity and better quality of the farm business.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Compare the traditional management and modern entrepreneurial approach to farm management.
2. Plan internal assumptions about the development of entrepreneurship in the farm.
3. Generate existing conditions and prerequisites for the development of entrepreneurship froman external business environment.
4. Think critically and constructively act in order to strengthen the business climate.
5. Self- evaluate and improve communication skills in farm business.
6. Entrepreneur manage personal and business development process using the knowledge,abilities and entrepreneurship skills.

Module content

Assumptions entrepreneurship farms; The strategy of entrepreneurial business; Resource production process in agriculture; The organization of production as a precondition for entrepreneurial management; The impact of the market on entrepreneurship; Complementary institutions - interaction and support entrepreneurship; Options agricultural development through the application of entrepreneurship in the business economy. Adoption of technology and technical skills, and expertise and applicability in a specific area of action; social skills related to communication skills, motivation and leadership of individuals and groups; conceptual, strategic skills related to the ability to see a business entity as a whole, creating a vision and strategy for the development of agricultural production.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☒ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are obliged to attend lectures. While listening to the modules in consultation with the lecturer agree on the topic of seminar work. Written seminar should be made available for review, and it independently represent. After that, students take written and oral final exam.

Literature

Required reading:

1. Deže, J. i sur. (2008): Agroekonomika – priručnik. Poljoprivredni fakultet Osijek i Osječko-baranjska županija, Osijek 1-11.
2. Hisrich, R. D. Peters, M. P. Shepherd, D. A. (2008): Poduzetništvo. Sedmo izdanje. MATE,Zagreb, pp 462-515.
3. Rouse, M. J., Rouse, S. (2005): Poslovne komunikacije - kulturološki i strateški pristup, Masmedia, Zagreb, str.203-271.

Recommended literature:

1. Deželjin J, Deželjin, J., Dujanić, M., Tadin, H., Vujić V. (2006): Poduzetnički menadžment, izazov,rizik i zadovoljstvo, Alinea, Zagreb.
2. Timons, J. A. (1999): New Venture Creation, Entreprenurship for the 21st century, McGraw-Hill, Boston.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.2	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.6	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	3.2	1-6	Preparing for exam by studying required and recommended literature	Written and oral exam
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 lectures teaching hours = 1.2 ECTS (30 teaching hours/125 hours of total load x 100 = 24% from total of 5 ECTS)
Seminar paper = 0.6 ECTS (15 hours/125 hours of total load x 100 = 12% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours of preparation/125 hours of total load x 100 = 64% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Agromarketing Management**	
Module coordinator	Ružica Lončarić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 30, E - 0, S - 15

Module aim

Introduce students with the agormarketing process using elements of the marketing mix, with special reference to the possibility of performing international agro-industrial market.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe the types of communication and marketing activities in an international environment.
2. Notice the connection management as a management tool and control marketing activities.
3. Clarify relationship of planning and control of marketing activities in agribusiness.
4. Spotting problems in the selection process ideas, development and selection of new products / services agri-food product.
5. Set possible marketing strategies of action in introducing new products to the market.
6. Present selected marketing strategy performance in the market for a specific product group.

Module content

The process of communication in international agromarketing, specific promotion in international agromarketing and propaganda (planning, propaganda campaigns, advertising media, and special forms of advertising). Productivity and management of productive functions (management, planning and control). Developing and testing new products and services (the dilemma of developing new products, effective organizational preparation, selection of ideas, development marketing strategy, business analysis, market testing, commercialization, the process of acceptance of new products by market).

Types of teaching	X lectures X seminars and workshops ☐ exercises ☐ distance education ☐ field work	X individual tasks ☐ multimedia and network ☐ laborator yX mentoring X other

Student requirements

All students are required to attend minimum 50% of the classes. Students should be prepared for discussion and solving practical tasks using relevant literature. Students should write mandatory seminar. Seminars will be presented orally, with Power Point program and its duration should notbe longer than 20 minutes. Schedule of oral presentations will be agreed in advance. Seminar isprecondition for attending oral exams.

Literature

Required reading:

1. Kesić, T. (1997): Marketinška komunikacija, MATE Zagreb.
2. Kotler, P. (1994): Marketing management, Informator Zagreb.3.Weihrid, H., Koontz, H. (1994) Menedžment, MATE Zagreb.

Recommended literature:

1. Previšić, J., Ozretić Došen, Đ. (2000) Osnove međunarodnog marketinga, Masmedija Zagreb.
2. Samuelson, P., Nordhaus, W. (2000) Ekonomija, 15. izdanje, Mate, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.2	1-6	Participation in the debate and expressing opinions	Attendance of the classes frequency and involvement into discussion
Analysis of case studies	0.4	1-6	Presentation, discussion	Frequency and involvementinto discussion solved tasks
Seminar	1.8	1-6	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam (oral)	1.6	1-6	Preparing for exam by studying required and recommended literature	Exam-presenting facts, argumenting, analysing case studies
Total	5			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
30 teaching hours (lectures) = 1.2 ECTS (30 teaching hours/125 hours of total load x100 = 24.00 % from total of 5 ECTS)
Analysis of case studies= 0.4 ECTS (10 hours of preparation /125 hours of total load x 100 = 8.00% from total of 5 ECTS)
Seminar paper = 1.8 ECTS (45 hours/125 hours of total load x100 = 36.00 % from total of 5 ECTS) Oral exam = 1.6 ECTS (40 hours of preparation/125 hours of total load x 100 = 32.00 % from totalof 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Organizational Behavior in Agriculture**	
Module coordinator	Davorin Turkalj	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 25, E - 0, S - 20

Module aim

Introduce postgraduates with methods and models of organizational modeling knowledge of general organizational assumptions, models and elements of organizational structure.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Distinguish basic conceptual system of organizational behavior.
2. Identify the elements that influence individual and organizational behavior.
3. Compare organizational structure.
4. Evaluate and calculate performance.
5. Analyze organizational change.

Module content

Theoretical basis of organizational behaviour, organizational behavior in the global context, based on individual behavior, motivation and understanding of design tasks that motivate, individual behavior and group-based behavior, leadership, power and politics, conflict. Based organizational structure, organizational design, performance evaluation, and reward systems, organizational structure, organizational change and development.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☒ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☒ mentoring
☐ field work	☐ other

Student requirements

Students are required to prepare for seminars and lectures using recommended literature. Students prepare a seminar work that is required. Seminar students present orally for about 15 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that students take to the final exam. Students are advised to prepare exams from mandatory literature.

Literature

Required reading:

1. Robbins, SP.: The essential elements of organizational behavior, Zagreb.

Recommended literature:

1. Campbell, DJ. (1997): Organizations and the Business Environment, Newcastle Business School,The University of Northumbria at Newcastle.
2. Huczynski, A., Buchanan, D. (2001): Organizational Behaviour, Edinburgh Gate, England2. A.Cassidy, A Practical Guide to Information Systems Strategic Planning.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	1.0	1-5	The study of literature, participation in class	Monitoring activities by talking to students
Seminar	0.8	1-5	Work on the project task, making presentations .pptx	Evaluation of project assignmentand presentation through predefined criteria
Final exam	3.2	1-5	Preparation for the examwith the agreed conditions	Oral exam
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads
25 teaching hours (lectures) = 1.0 ECTS (25 teaching hours/125 hours of total load × 100 = 20% from total of 5 ECTS)
Seminar = 0.8 ECTS (20 hours/125 hours of total load × 100 = 16% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours/125 hours of total load × 100 = 64% from total of 5 ECTS)

Module quality assessment

Assesment is carried out by students, teachers and experts in the field of study, and if necessaryinternational supervision.

Module name	**Human Resource Management**	
Module coordinator	Jadranka Deže	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 25, E - 0, S - 20

Module aim

Train students for optimal selection, deployment and motivation of workers for successful job performance. Planned, simplified and eased work should give greater impact. Lowering the consumprion of human labour and machinery in production should increase the productivity, efficiency and competitiveness of production.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Analyze the level of labour productivity and competitivenss of agricultural production.
2. Calculate the labour performance standards and consumprion of human labour and machinery.
3. Compile technological map for production lines.
4. Planning of work force in agriculture in accordance with the structure of production.
5. Predict organizational and economic measures to increase labour productivity.
6. Evaluate the system development and advancement of employees.

Module content

The significance, objectives and responsibilities of human resource management. The development of technology, changes in organizational structure, size of the organization and their impact on planning of necessary number of people. Physiology and energetics work. Environmental impact on performance at work. A chronograph record of work process. Analysisof time consumprion and determination of standard time. Designing the standards of performance. Compiling the technological maps of production with a calendar work for each individual production line. Plannning the consumprion of human labour. Rewarding and stimulation. Analysis of human labour and machinery costs for production of certain lines in agricultural production. The impact of human labour productivity on economic efficiency and profitabiltiy in production.The rationalization of labour. Method of analytical assessment of labour. Selection of personnel, introduction to business, motivation, training and rewarding. Work safety and health protection of employees.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☐ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are obliged to attend lectures and exercises. During the module duration, students and module coordinator will determine the topic of seminar. The seminar should be brought for review, after which an individual presentation should be performed. After that, students can take written and oral final exam.

Literature

Required reading:

1. Gutić, D., Rudelj, S. (2012): Menadžment ljudskih resursa, Grafika d.o.o. Osijek.
2. Noe, R., A., Hollenbeck, J., R., Gerhard, B., Wright, P., M. (2006): Menadžment ljudskihpotencijala, MATE, Zagreb.
3. Marušić, S. (2001): Upravljanje ljudskim potencijalima, Ekonomski fakultet, Zagreb.
4. Sikavica, P (2011): Organizacija, Školska knjiga, Zagreb.
5. Sikavica, P., Hunjet, T., Ređep Begičević, N., Hernaus, T. (2014): Poslovno odlučivanje, Školskaknjiga Zagreb.
6. Olson D. K. (2004) Farm Management, Principles and Strategies, Iowa State Press a BlackwellPublishing Company.
7. Weihrich, H., Koontz, H. (1994): Menedžment, deseto izdanje, MATE d.o.o.,

Zagreb.Recommended literature:

1. Tudor, G. i sur. (2010): Vođenje i motiviranje ljudi, MEP d.o.o. Zagreb.
2. North, K. (2008): Upravljanje znanjem, Slap, Zagreb.
3. Buble, M. (2011): Poslovno vođenje, MEP d.o.o. Zagreb.
4. Škreblin, D. (2010): Upravljanje vremenom, Novalius, Matica hrvatska.
5. Turner, C. (2003): Vođenjem do uspjeha, Mladost, Zagreb.
6. Labour law, zakoni.hr – revised text.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.0	1-6	Literature studying, assignment work	Reviewing student's work and assignments
Seminar	0.8	1-6	Literature studying, seminar preparation and presentation	Evaluation of seminar
Final exam	3.2	1-6	Preparation for the exam by studying the required and recommended literat ure	Written and oral final exam
Total	5.0			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)5 ECTS credits = 125 hours of module loads
25 teaching hours (lectures) = 1.0 ECTS (25 teaching hours/125 hours of total load × 100 = 20% from total of 5 ECTS)
Seminar = 0.8 ECTS (20 hours/125 hours of total load × 100 = 16% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours/125 hours of total load × 100 = 64% from total of 5 ECTS)

Module quality assessment
The quality and effectiveness of module is going to be carried by teachers and experts in the fieldof the study, if necessary, international supervisors will be involved in the process.

Module name	**Financial Management in Agriculture**	
Module coordinator	Ivan Štefanić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 25, E - 0, S - 20

Module aim

The aim of the module is to gain theoretical knowledge in financial management and the implementation of the adopted principles and methodology into practice. After the module students should be able to: write a fully developed business plan and investment study, perform business analysis and optimization of a certain company or production process, choose adequate financing for specific business necessities and different organizational forms.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Transform business idea into fully developed business plan or investment study.
2. Understand the influence of financial structure on financial result under inflation.
3. Assess financial result of various entrepreneurial endevours.
4. Optimize financial result with help of linear programming.
5. Express and solve business problem with help of mathematical and/or financial methods.

Module content

Financial management – financial functions, risik and timing, financial goals and life cycles of companies; Financial management in agriculture – specifics of agricultural financing; Finacial analysis, planning and control – system of coordinated financial statements; Tools for financial analysis of agricultural companies or farms, optimization of financial performance with help of linear programming, FDIN and FADN systems, planning and feasibility study; Capital structure, solvency and risk; inflation, risk and financial planning; financial mathematics for entrepreneurs, loans for agricultural production; Financial agents in agriculture; Financial markets in agriculture.

Types of teaching

☒ lectures	☒ individual tasks
☒ seminars and workshops	☒ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☒ mentoring
☐ field work	☐ other

Student requirements

Studenats are expected to attend the classes regularly and participate in class discussions. Every student have an obligation to prepare fully developed business plan on given topic. During semester, three partial assessments are foreseen:

1. Partial assessment - preparation of financial plan - esay minimal 1000 words, without tables and graphs.

2. Partial assessment - feaasibily check of entrepreneurial project through SWOT analysis, designof business model and IP protection strategy – esay minimal 1000 words, without tables and graphs.
3. Partial assessment - optimization of financial result with help of linear programming - esay minimal 1000 words, without tables and graphs.
After lectures are finished, students could approch written examination. It is recommended to make notes during the lectures and study required reading. Presentations used during the lectures and all literature are available via distance learning system MERLIN. Teaching include lectures, consultation and mentoring, preparation of individual project assignment. Student assessment is continous and include public presentation of individual project.

Literature

Required reading:

1. Van Horn, James C. (1993): Financijsko upravljanje i politika. MATE, Zagreb.
2. Barry, P. J., Ellinger, P. N., Hopkin, J. A., Baker, C. B. (1995): Financial Management in Agriculture. Interstate Publishers, Inc., Danville, Illinois.
3. Karić, M., Štefanić, I. (1999): Troškovi i kalkulacije u poljoprivrednoj proizvodnji, Poljoprivrednifakultet u Osijeku, Osijek.

Recommended literature:

1. Tracy, J. A. (1994): Kako čitati i razumjeti financijski izvještaj. Jakubin i sin, Zagreb.
2. Oltmans, A. W. (1995): The leverage Game, Agricultural Finance review, London.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures a ndseminars	1.0	1-5	Attending lectures, discussions during the lectures ans seminars, assignment work literature studying andpreparation for the lectures	Checking student activity orally (conversation), reviewing student'swork and assignments
Preparation and presentation of project assignment	0.8	1-5	Literature studying, preparation and presentation of project assignment	Project assignment examination and evaluation according to the pre-established criteria
Final exam	3.2	1-5	Preparing for exam bystudying required andrecommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:
Module carries 5 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)5 ECTS credits = 125 hours of module loads
25 teaching hours (lectures + exercises) = 1.0 ECTS (25 teaching hours/125 hours of total load x100 = 20% from total of 5 ECTS)
Seminar paper = 0.8 ECTS (20 hours/125 hours of total load x 100 = 16% from total of 5 ECTS)
Final exam = 3.2 ECTS (80 hours of preparation/125 hours of total load x 100 = 64% from total of5 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Cost Management**	
Module coordinator	Ljubica Ranogajec	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 25, E - 0, S - 20

Module aim
Train students classification and calculation of costs using different methods for cost management in order to achieve economical and profitable production.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Appoint types of costs are significant to cost management in the enterprise.
2. Analyze related income and expenses.
3. Distinguish between the methods of calculation and cost management.
4. Compile calculations of individual lines of agricultural production.
5. The calculated success indicators of agricultural enterprises.
6. Propose contemporary technique and costing methods.

Module content
Importance, classification and characteristics of costs in agricultural company; Division of costs significant for cost management; Opportunity costs; The marginal costs; Standard costs; Avoiable and unavoidable costs; Analysis of the relationship between costs and revenues; The role of costs in business decision making; The calculation of production costs; Calculation per types and groups of costs; Costing by places; Depreciation methods and revaluation; Estimates of the cost of labor; Costing by carriers; Types of ancillary costs and expenses crossover; Calculations in the agricultural enterprise; Methods of separation of fixed and variable costs; Summary and scalar calculation of financial results; Measuring the business success of the company.

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students are obliged to prepare for seminars and practice using recommended literature. Students prepare a seminar work that is required. Seminar students present orally for about 20 minutes with a PowerPoint presentation. Schedule of presentation will be arranged in advance. After that, students write a final exam. Students is recommended prepare exams from the obligatory reading.

Literature

Required reading:

1. Belak V. (1995): Menadžersko računovodstvo, RRiF, Zagreb.
2. Chadwick, L. (2000): Osnove upravljačkog računovodstva, Mate, Zagreb .
3. Karić, M. (2001): Upravljanje troškovima, Ekonomski fakultet u Osijeku, Osijek.
4. Karić (2001): Upravljačko računovodstvo, Ekonomski fakultet u Osijeku, Osijek.
5. Polimeny, S. R., Handy, A. Sheila, Cashin, A. J. (1999): Troškovno računovodstvo, Faber &Zgombić, Zagreb.
6. Calculation catalogue:

http://www.savjetodavna.hr/?page=savjeti,306,360

Recommended literature:

1. Karić, M. (2002): Kalkulacije u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek.
2. Meigs & Meigs, (1999): Računovodstvo: Temelj poslovnog odlučivanja (prijevod), Mate, Zagreb.
3. Polimeny, S. R., Handy, A., Sheila, Cashin, A. J. (1999): Troškovno računovodstvo, Faber &Zgombić, Zagreb.
4. Santini, I. (1999): Troškovi u poslovnom odlučivanju, HIBIS, Zagreb.
5. Skupina autora, (2009): Računovodstvo proizvodnje, RRiF, Zagreb.
6. Turk, I. Kavčič, S. Koželj, S. (2001): Stroškovno računovodstvo: Slovenski inštitut za revizijo, Ljubljana.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	1.0	1-6	Studying literature	Checking the activities carried through the oralconversation
Seminar	0.8	1-6	Studying literature, making,and presentation of seminars	Review and evaluation of the seminar work according to preestablished criteria
Final exam	3.2	1-6	Preparation for the exam bystudying recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:

The module has 5 ECTS credits

1 ECTS credit = 25 hours of load (hours of student work)

5 ECTS credits = 125 hours of load modules

25 hours of lectures = 1.0 ECTS (25 teaching hours / 125 hours total load x 100 = 20% of total 5 ECTS)

20 hours of seminar work = 0.8 ECTS (20 hours / 125 hours total load x 100 = 16% of total 5 ECTS) Final exam = 3.2 ECTS (80 hours of preparation / 125 hours of total work hours x 100 = 64% of total 5 ECTS)

Module quality assessment

The evaluation of teachers and the quality of the above modules via anonymous student surveys.

Module name	**Principles of Agricultural Economics**	
Module coordinator	Zdravko Tolušić	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	P - 45, V - 0, S - 10

Module aim

The objective of the module is to define and emphasize the importance of resources in agricultural production (the role and types of labor, the concept and types of work objects), to evaluate and remunerate labor, explain the significance of studying labor, and highlight the role of information as an economic resource in agricultural production.

Terms of admission

No prerequisites.

Expected learning outcomes

After successfully completing the course, the student will be able to:

1. Analyze the allocation of scarce natural and economic resources
2. Define the resources of agricultural production
3. Define and analyze the concept and types of labor
4. Analyze the role of capital in agricultural production
5. Understand the impact of information as an economic resource

Module content

Allocation of Limited Natural Resources, Role of Production Factors (Labor, Capital, Land), Assessment of Natural Resources in Dynamic Economic Systems: The challenge of resource scarcity and its management. Economic, Social, and Ecological Consequences of Inefficient Resource Use: Examining the impacts that arise when resources are not used effectively. Law of Diminishing Returns: Understanding how increased input can lead to progressively smaller increases in output. Marginal and Multi-Criteria Optimization in Resource Use: Strategies for maximizing the utility of resources while balancing multiple criteria. Costs and Benefits in the Economic Valuation of Resources: Analyzing both the expenditures and benefits involved in valuing resources economically.

Types of teaching

☒ lectures
☒ seminars and workshops
☐ exercises
☐ distance education
fieldwork
☐ individual tasks
☐ multimedia and network
☐ laboratory
☐ mentoring
other

Student requirements

Students are required to attend lectures and practical exercises. During the course, in agreement with the course instructor, they select a topic for their seminar paper. The paper must be submitted for review and subsequently presented independently. Students will take a written and oral final exam.

Literature

Required reading:

1. Samuelson, P.A., Nordhaus, W.D. (2011.): Ekonomija, 19. izdanje. Zagreb: MATE d.o.o.
2. Črnjar, M., Črnjar, K. (2009.): Menadžment održivog razvoja. Fakultet za menadžment u turizmu i ugostiteljstvu, Rijeka

Recommended literature:

1. Zmaić, K. (2008.): Osnove agroekonomike, Poljoprivredni fakultet u Osijeku, Osijek
2. Ivančević, T., Perec, K. (2017.): Osnove ekonomije. Zagreb, Visoka poslovna škola, Zagreb

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	1.6	1-5	Studying literature	Checking the activities carried through the oral conversation
Seminar	0.4	1-5	Studying literature, making, and presentation of seminars	Review and evaluation of the seminar work according to preestablished criteria
Final exam	3.0	1-5	Preparation for the exam by studying recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:

The module has 5 ECTS credits
1 ECTS credit = 25 hours of load (hours of student work)
5 ECTS credits = 125 hours of load modules

45 hours of lectures = 1.6 ECTS (45 hours of lectures / 125 total workload hours x 100 = 36.0% of the total 5 ECTS)
10 hours of seminars = 0.4 ECTS (10 hours of seminars / 125 total workload hours x 100 = 8.0% of the total 5 ECTS)
Final exam = 3.0 ECTS (70 hours / 125 total workload hours x 100 = 56.0% of the total 5 ECTS)

Module quality assessment

The evaluation of teachers and the quality of the above modules via anonymous student surveys

Module name	**Organizacija i troškovi poljoprivredne proizvodnje**	
Module coordinator	Ljubica Ranogajec	
Study programme	Postgraduate specialist study Farm Management	
Module status	Elective module	
Year of studies	First	
Credits andteaching	ECTS credits	5
	Lecture hours (L+E+S)	P - 45, V - 10, S - 0

Module aim

To equip students with the skills to establish and maintain favorable relationships between the factors of crop and livestock production, and to perform work processes rationally with the aim of achieving efficient and profitable agricultural production.

Terms of admission

No prerequisites.

Expected learning outcomes

After successfully completing the course, the student will be able to:

1. Define the concept of organization, forms of business entities according to the Companies Act, and family agricultural holdings, along with their business functions and types of organizational structures.
2. Identify the factors of agricultural production and evaluate relationships within and between them.
3. Calculate the optimal level of investment intensity in line with raw material costs and finished product prices.
4. Standardize the performance of human labor and machinery for specific tasks, plan the use of raw materials and auxiliary materials, and present the technological map of individual production lines.
5. Plan the costs of raw materials, auxiliary materials, human labor, and machinery, and calculate production cost estimates.
6. Analyze economic indicators of production success and operations, and select the optimal production structure.

Module content

Concept, Subject, Methods, Objectives, Tasks, and Development of the Science of Organization and Management of Agricultural Enterprises, Specific Characteristics of Agricultural Production: Understanding the unique aspects of agriculture that influence organizational and managerial decisions. Concept of Entrepreneurship: Definition and application within the agricultural sector.

Forms of Agricultural Enterprises: Business functions and organizational structures within different types of agricultural holdings. Elements of Production: Production Means: Fixed assets, work objects, and human labor. Production Orientation: Diversity of production and economically justified investment levels. Land Organization and Management: Land tenure structure and its optimization.

Equipping with Mechanization: Selection and allocation of machinery for agricultural operations. Human Resource Management: Effective management of labor for operational efficiency.

Performance Calculation: Assessing productivity and efficiency of labor and machinery. Organization of Work Processes: From soil preparation to harvesting and crop collection. Information System and Operational Planning: The role of data and planning in effective agricultural management. Cost Types: Identification and management of costs in production. Economics of Mechanization Use: Evaluating the cost-effectiveness of machinery utilization. Profitability of Agricultural Production Lines: Assessing the economic viability of different production lines within agriculture

Types of teaching

☒ lectures
seminars and workshops
☒ exercises
☐ distance education
fieldwork
☐ individual tasks
☐ multimedia and network
☐ laboratory
☐ mentoring
other

Student requirements

Students are required to attend lectures and practical exercises with active participation in task completion. During the semester, two partial written exams will be held, along with a final written and oral exam. At the beginning of the semester, students will be informed about the schedule of exams. It is recommended that students take notes during lectures, especially during practical exercises. Exams should be prepared using the required literature and personal notes with examples of completed tasks.

Literature

Required reading:

1. Božina, A., Cirkveni Filipović, T., Jurić, Đ., Marečić, D., Markota, Lj., Vidović, A., Vuk, J. (2021.): Obiteljska poljoprivredna gospodarstva, Biblioteka računovodstvo, Zagreb
2. Karić, M. (2002.): Kalkulacije u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek
3. Sikavica, P. (2011.): Organizacija, Školska knjiga, Zagreb
4. Weihrich, H. i Koontz, H. (1998.): Menedžment, Jedanaesto izdanje, MATE, Zagreb

Recommended literature:

1. Lacković, Z. (2004.): Management malog poduzeća, Elektrotehnički fakultet Osijek, Osijek
2. Pratt, E. (2023.): The Organization of Agriculture. Hardpress Publishing. Amazon.com
3. Zakon o trgovačkim društvima, https://www.zakon.hr/z/546/Zakon-o-trgova%C4%8Dkim-dru%C5%A1tvima
4. Zakon o obiteljskom poljoprivrednom gospodarstvu, https://www.zakon.hr/z/1015/Zakon-o-obiteljskom-poljoprivrednom-gospodarstvu
5. Zakon o poljoprivrednom zemljištu, https://www.zakon.hr/z/133/Zakon-o-poljoprivrednom-zemlji%C5%A1tu

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	1.6	1-5	Studying literature	Checking the activities carried through the oral conversation
			Studying literature, making,	Review and evaluation of

Seminar	0.4	1-5	and presentation of seminars	the seminar work according to preestablished criteria
Final exam	3.0	1-5	Preparation for the exam by studying recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:
The module has 5 ECTS credits
1 ECTS credit = 25 hours of load (hours of student work)
5 ECTS credits = 125 hours of load modules

45 hours of lectures = 1.8 ECTS
(45 hours of lectures / 125 total workload hours × 100 = 36.0% of the total 5 ECTS)
10 hours of practical exercises = 0.4 ECTS
(10 hours of exercises / 125 total workload hours × 100 = 8.0% of the total 5 ECTS)
Final exam = 2.8 ECTS
(70 hours of preparation / 125 total workload hours × 100 = 56.0% of the total 5 ECTS)

Module quality assessment
The evaluation of teachers and the quality of the above modules via anonymous student surveys

After completing the study, student will be able to:

Learning Outcome 1	Recommend organizational and economic measures to improve business results
Learning Outcome 2	Implement innovative form of development strategy for small and medium farms in the economy of knowledge
Learning Outcome 3	Propose modern technique and costing methods
Learning Outcome 4	Evaluate the effects of agricultural-political measures on agrarian structure
Learning Outcome 5	Select marketing strategy of performance in the market for a specific product group
Learning Outcome 6	Identify methods of operations research necessary for economic analysis
Learning Outcome 7	Create PAM matrix and DCR ratios for increasing the competitiveness of the national economy
Learning Outcome 8	Use of economic, social and environmental indicators for sustainable agricultural production.

PLANT PROTECTION

2.5. Modules of postgraduate specialist study Plant Protection

Compulsory modules:

	Module name	Teaching hours	ECTS credits
1.	Pest Ecology in Cultivated Plants	39	10
2.	Integrated Pest Management	35	10

Elective modules:

	Module name	Teaching hours	ECTS credits
	Group ZOOLOGY		
1.	Acarology	20	6
2.	Quarantine Pests	15	5
3.	Nematology	30	6
4.	Pests of Field Crops	20	6
5.	Insect Systematic	20	6
6.	Stored Product Pests and Their Control	20	6
7.	Pests of Fruit Trees and Grape Vines	20	6
8.	Insect Pests in Horticulture	20	6
9.	Urban Entomology	15	3
10.	Pests of Vegetables	20	6
	Group PHYTOPATHOLOGY		
11.	Diseases of Ornamental Plants	20	6
12.	Seed Diseases	20	6
13.	Diseases of Tree Fruits and Grapevine	20	6
14.	Ecological Microbiology	20	6
15.	Anatomy and Physiology of Infected Plants	15	5
16.	Laboratory Methods in Mycology	20	4
17.	Arable Crop Diseases	20	6
18.	Vegetable Diseases	20	6
	Group HERBOLOGY		
19.	Monitoring and Management of Allergenic Plants	25	5
20.	Pesticide Application and Legislation	20	6
21.	Weed Communities in Agriculture	20	6
22.	Plant pProtection Program Design	20	4
23.	Plant Protection in Protected Areas	20	4
24.	Weed Control Economics	15	3

2.5.1. Learning outcomes of postgraduate specialist study PlantProtection

Module name	**Pest Ecology in Cultivated Plants**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 30, E - 0, S - 9

Module aim
The influence of environmental factors on the growth and development of plant pests will be presented to students.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Predict the impact of environmental factors on the development of pests.
2. Create a forecast occurrence of pests.
3. Identify natural enemies and insects as vectors of plant diseases.
4. Identification of biological and ecological characteristics of weeds.
5. Interpretation of interaction and competition ability of weeds in anthropogenic habitats.

Module content
Variability on development of plant diseases, the influence of air temperature, humidity and lighton pathogenic fungi and bacteria, the influence of pH and the lack of macroelements and microelements in plant nutrition, the unfavourable influence of poisonous gases (SO2, SO3), acidrains, phythotoxiticy of plant protection agents.The influence of environmental factors on the pest development, forecast service, plant diseases transmitted by insects, natural enemies.Plant species and environment (autoecology): life cycle and reproduction, life cycle and environment, interaction of various plant species in anthropogenic ecosystems; plant communities and environment (eim ecology): characteristics of plant communities in anthropogenic ecosystems, classification and succession; the influence of environmental factors

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For

laboratory work, students need emergency protective laboratory clothing (lab coat). During the 1-vegetation year students have to monitor populations of pests and weeds and intensity of thedisease at a given location and eniromental conditions. After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Agrios, G. N. (2005): Plant Pathology. General Aspects. Academic Press, New York.
2. Kišpatić, J. (1992): Opća fitopatologija. Agronomski fakultet Sveučilišta u Zagrebu.
3. Gullan, P. J., Cranson, P.S. (1994): The Insects, An Outline od Entomology. Chapman & Hall.
4. Odum P. E. (1959): Fundamentals of ecology. W.B. Saunders Company, USA.
5. Igrc Barčić, J., Maceljski, M. (2001); Ekološki prihvatljiva zaštita bilja od štetnika. Zrinski d.d., Čakovec
6. Barbour, M. G., Burk, J. H., Pitts, W. D. (1987): Terrestrial plant ecology. The Benjamin /Cummings Publishing Company, Inc.
7. Cousens, C., Mortimer, M. (1995): Dynamics of weed populations. Cambridge University

Press.Recommended literature:

scientific journals

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1.2	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.36	1-5	Literature studying, work in Lab	evaluation according to the pre-established criteria
Individual tasks	4.0	1-5	Work on fields	evaluation according to the pre-established criteria
Final exam	4.64		Preparing for exam by studying required and recommended literature	Exam (oral)
Total	10.0			

The way of calculating ECTS credits for certain activities:

Module carries 10 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)10 ECTS credits = 250 hours of module loads

30 teaching hours (exercises) = 1.2 ECTS (20 teaching hours/150 hours of total load x 100 = 12% from totalof 10 ECTS)

Seminar paper = 0.36 ECTS (9 hours/250 hours of total load x 100 = 13,33% from total of 10 ECTS)Individual tasks = 4.0 ECTS (100 hours/250 hours of total load x 100 = 40% from total of 10 ECTS)

Final exam = 4.64 ECTS (111 hours of preparation/250 hours of total load x 100 = 44.4% from total of 10ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Integrated Pest Management**	
Module coordinator	Renata Baličević	
Study programme	University specialist study Plant Protection	
Module status	Compulsory module	
Year of studies	First	
Credits and teaching	ECTS credits	10
	Lecture hours (L+E+S)	L - 20, E - 5, S - 10

Module aim

Introduction to development, principles, methods, measures and systems of integrated pest management.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Explain the importance of measured of integrated pest management in agricultural production.
2. Identify the goals of proper application of plant protection products depending on the currentrequirements producers, processors and consumers and within the legal framework.
3. Perform a proper application of pesticides with the prevention of contamination of theenvironment.
4. Comment, argumentative and critically, a given topic in the field of plant protection.

Module content

Basic principles and methods of integrated pest management (indirect and direct, administrative,cultural, mechanical, physical, biological, chemical); programs of integrated pest management inagricultural production.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are expected to attend classes and participate actively in the tasks during the lectures and exercises. All students are obliged to prepare for seminars and exercises by studying of relevant literature. Students are obliged to prepare and write seminar paper. Seminar paper should be present orally for about 20 minutes with a Power Point Presentation. Schedule of presentation will be arranged in advance. For laboratory work students are required to wear protective clothing. For each laboratory exercise the student must be prepared according to the necessary literature for each teaching unit. After that, students write a final exam. Students areadvised to prepare exams from required literature.

Literature

Required reading:

1. Ciglar, I. (1988): Integrirana zaštita voćnjaka i vinograda, Zrinski, Čakovec.

2. Igrc-Barčić, J., Maceljski, M. (2001): Ekološki prihvatljiva zaštita bilja od štetnika. Zrinski, Čakovec.
3. Tehnološke upute za integriranu proizvodnju u Republici Hrvatskoj. Ministarstvo poljoprivredewww.mps.hr

Recommended literature:

Published scientific papers in reference journals and proceedings.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	1	1-4	Reading required literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Seminars and seminar paper preparation	1.4	1-4	Studying the required literature, writing and presentation of seminarpaper	Review and evaluationof seminar paper according to pre-defined criteria.
Preparation for laboratory exercises	0.6	1-4	Studying the required literature	Assessment of the activities carried out through conversation
Written exam from exercises	1	1-4	Exam preparation throughstudying the literature	Written exam
Final exam	6	1-4	Exam preparation through studying the required and recommended literature	Exam (written or oral)
Total	10			

The way of calculating ECTS credits for certain activities:

Module has 10 ECTS credits

1 ECTS credit = 25 workload hours (hours of student work)

10 credits = 250 workload hours

25 lecture hours (lectures and excercises) = 1 ECTS (25 lecture hours/250 workload hours x 100 = 10.0% of total 10 ECTS

Seminar paper = 1.4 ECTS (10 seminar hours + 25 hours for preparation/250 workload hours x100 = 14.0% of total 10 ECTS

Preparation for laboratory exercises = 0.6 ECTS (15 hours /250 workload hours x 100 =6.0% of total 10 ECTS)

Written exam from exercises = 1 ECTS = (25 hours / 250 workload hours x 100 = 10% of total 10 ECTS)
Final exam = 6 ECTS = (150 hours / 250 workload hours x 100 = 60% of total 10 ECTS)

Module quality assessment
The evaluation of lecturer and module quality through anonymous surveys.

Module name	**Acarology**	
Module coordinator	Ivana Majić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim

To introduce students to both useful and harmful mite species in field crops, and mite species ofstored grain crops.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Explain the importance and role of useful and harmful mites in field crops and storage facilities.
2. Describe and identify the most important families and genera of mites.
3. Define and compare damage and management measures of harmful mites.
4. Define ways and possibilities of introduction and cultivation of useful mites.
5. Argue the advantages and disadvantages of using beneficial mites in agricultural production.
6. Integrate knowledge and make a decision on the need to apply management measures.

Module content

Useful mites in field crops (family Phytoseiidae: genus Phytoseiulus, Amblyseius and Thyphodromus; family Cheyletidae, species C. eruditus and C. trouessarti) – their role, the way of introduction and growth. Harmful mites in field crops (family Tyroglyphidae, Cheyletidae, Glycyphagidae and Tetranychidae) – biology, morphology, damage, and control treatment. Mite species in storage facilities (families Tyroglyphidae, Cheyletidae, Tarsonemidae, Pyroglyphidae, Pyemotidae, Ascidae, Glycyphagidae, Tydeidae, Amerosiidae, Dermanyaaidae) – biology, space and time distribution, ecology, damage and control treatment.

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students should be prepared and be able to actively participate and discuss topics related to Acarology, which involves reading recommended literature. Student creates individualy seminarpaper, and present it orally in a twenty-minute period using PowerPoint presentation. Lab coat is required for the purpose of laboratory work. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Genson, U., Smiley, R. L. (1990): Acarine biocontrol agents – an illustrated key and manual.Chapman and Hall, Lonodon.
2. Kostiainen, T. S., Hoy, M. A. (1996): The Phytoseiidae As Biological Control Agents of Pest Mitesand Insects A Bibliography (1960-1994). IFAS, University of Florida, Gainesville.
3. Hoy, M. A. (2011): Agricultural Acarology: Introduction to Integrated Mite Management. CRCPress Inc., 430 pp.
4. Zhang, Z.-Q. & Liang, L.-R. (1997): An Illustrated Guide to Mites of Agricultural Importance. Tongji University Press, Shanghai. 228 pp
5. Korunić, Z. (1990): Štetnici uskladištenih poljoprivrednih proizvoda – biologija, ekologija isuzbijanje. Gospodarski list, Zagreb.

Recommended literature:

1. Bolland, H. R., Gutierrez, J. & Flechtmann (1998) World Catalogue of the Spider Mite Family(Acari: Tetranychidae). Brill: Leiden, Boston, Koln. Hardcover, 392 pp
2. Subramanyam, B., Hagstrum, D. W. (1995): Integrated management of insects in storedproducts. Marcel Dekker, Inc. New York, USA.
3. Published scientific papers in scientific journals and proceedings for seminar preparations.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-6	Literature studying, assignment work	Checking student activity through discussions, reviewing student's work and assignments
Seminar	0.2	1-6	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Lab work	1.0	1-6	Literature studying, work in Lab	Evaluation according to the pre-established criteria
Final exam	4.2	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working
hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x 100 = 3.33% from total of 6 ECTS)Lab work = 1.0 ECTS (25 hours/150 hours of total load x100 = 16.67% from total of 6 ECTS) Final exam = 4.2 ECTS (105 hours /150 hours of total load x 100 = 70,00% from total of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Quarantine Pests**	
Module coordinator	Mirjana Brmež	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L -10 , E - 0, S - 5

Module aim
Students would get acquainted to the list of quarantine pests.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Made a list of a qurantine pests for Croatia.
2. Recognize the dangers of quarantine pest spreading.
3. Described the way of spreading of the quarantine pests.
4. Collect legislation concerning quarantine pests.

Module content
A1 i A2 list of quarantine pests. Elaboration of quarantine pests listed in EPPO.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. Studentsare advised to prepare exams from required literature list.

Literature
Required reading:

1. Quarantine Pests for Europe. CABI and EPPO for the EU. CAB International p. 1425.
2. EPPO Bulletin.

Recommended

literature:

1. Journals and scientific papers relevant to quarantine pests.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.40	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-4	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	4.40	1-4	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.00			

The way of calculating ECTS credits for certain activities:

1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

10 teaching hours (lectures) = 0.40 ECTS (10 teaching hours/125 hours of total load x 100 = 8.00 % from total of 5 ECTS)

Seminar paper = 0.20 ECTS (5 hours/125 hours of total load x 100 = 4.00 % from total of 5 ECTS)Final exam = 0.60 ECTS (110 hours of preparation/125 hours of total load x 100 = 88.00 % from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Nematology**	
Module coordinator	Mirjana Brmež	
Study programme	Postgraduate specialist study Plant protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 15, E -15, S - 0

Module aim

Students would get acquainted with nematode morphology, development, life cycle, feeding habit, parasitism, systematics and nematodes as virus vectors.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify plant parasitic nematodes to genus level.
2. Identify nematodes as vectors of the virus.
3. Use laboratory equpment for free-living and cyst nematodes separation.
4. Recommend protective measures for plant parasitic nemtodes.

Module content

Through the exercises and lectures students will get educatation about techniques in nematology laboratory, determination of specific nematode genera, virus vectors, free living andcyst nematodes, and protection measures in Nematology.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare forlectures and exercises using recommended reading literature. After that, students write a final exam. Students are advised to prepare exams from required literaturelist.

Literature

Required reading:

1. Andrassy, J. (1984): Klasse nematoda. Gustav Fisher Verlag, Stuttgart, pp. 509.
2. Bongers, T. (1994): De nematoden van Nederland. KNNV: Utrecht. pp. 408.
3. Mai, W. F., Lyon, H. H. (1975): Pictorial key to genera of Plant-parasitic nematodes. CornellUniversity Press. Ltd. USA.
4. Sadekm M. A. (1980): Plant nematology an agricultural training aid. Nema Aid Publication,USA.
5. Ivezić, M. (2014): Fitonematologija. Poljoprivrednog fakulteta u Osijeku

Recommended literature:

Scientific and professional papers

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures +	1.2	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Final exam	4.8	1-4	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits

1ECTS credit = 25 workload hours (student's working hours)

6 ECTS credits = 150 hours of module loads

30 teaching hours (lectures + exersise) = 1.2 ECTS (30 teaching hours/150 hours of total load x 100 = 20% from total of 6 ECTS)

Final exam = 4.8 ECTS (120 hours of preparation/150 hours of total load x 100 = 80% from totalof 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Pests of Field Crops**	
Module coordinator	Ivana Majić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S -5

Module aim

Pests of field crops, introduced insects in our country which may cause economic damages, as well as methods of detection.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Show most important insect pest in field crops during the growing season.
2. Develop a plan of control for specific pest insects.
3. Identify the pest insects in crop production.
4. Collect and create a collection of of insects.

Module content

Insects in the soil insect pests in the vegetation. Through seminar work students will analyze common problems in crop production and will debate in finding solutions of problems ("case studies"). Scrapbookers of insects are important for crop production.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Maceljski, M., (2002): Poljoprivredna entomologija, Zrinski, Čakovec, 2002.
2. Gullan, P. J., Cranston, P. S. (1994): The Insects, an Outline of Entomology. Chapman & Hall.
3. Ivezić, M. (2008): Entomologija – kukci i ostali štetnici u ratarstvu. Grafika d.o.o.
4. Dent, D. (1993): Insect pest management. CAB International. Redwood books, UK.
5. The keys for insect identification

Recommended literature:

1. Manuals of forecasting services for crop protection.
2. The professional works in Entomology

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-4	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	5.20	1-4	Preparing for exam bystudying required andrecommended literature	Exam (oral or written)
Total	6			

The way of calculating ECTS credits for certain activities:

1ECTS credit = 25 workload hours (student's working hours)
6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.6 ECTS (15 teaching hours/150 hours of total load x100 = 10.00% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x100 =3.33 % from total of 6 ECTS)
Final exam = 5.20 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66 % fromtotal of 4 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Insect Systematic**	
Module coordinator	Ivana Majić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Compulsory module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 5, E - 10, S - 5

Module aim

Insect taxonomy important families of insects in agriculture.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Indicate and describe systematic units.
2. Describe the characteristics of individual orders of insects important to agriculture.
3. Describe the types of insects to species level.
4. Collect insects and create a collection of insects.

Module content

Morphological characteristics of insects are important for their determination (antennae, legs, wings, etc.), system functions of organs and development of insects. New insights and methods in the determination of insects, preparation and taxidermy insects and making insect collections.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Booth, R. G., Cox, M. L., Madge, R. B. 3. Coleoptera, IIE Guides to insects of importance to man,International Institute of Entomology (An Institute of C.A.B Internatinal) London.
2. Chinery, M. (1987): Guida degli insetti d,Europa. William Collins Sons & Co. Ltd, London.
3. Spencer, A. K. (1972): Handbooks for the Identification of British Insects, Diptera Agromyzidae,Royal Entomological Society of London, Vol. X, part 5.

4. Stroyan, H. L. G. (1984): Handbooks for the Identification of British Insects : Aphides - Pterocommatinae and Aphidinae (Aphidini) Homoptera, Aphididae, Royal Entomological Societyof London, Vol. 2, part 6.
5. Keys for insect

identification.Recommended

literature:

Journals and papers on insect systematics and entomology.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-4	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	5.2	1-4	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	6			

The way of calculating ECTS credits for certain activities:
1ECTS credit = 25 workload hours (student's working hours)
6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/155 hours of total load x100 = 10.00% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x100 = 3.33% from total of 6 ECTS)
Final exam = 5.20 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66% fromtotal of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Stored Product Pests and Their Control**	
Module coordinator	Anita Liška	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	Secound	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim
Biology and ecology of pests in storage facilities (insects, mites, rodents, birds) and their control.

Terms of admission
No prerequisites

Expected learning outcomes
After completing the module, student will be able to:
1. Synthesize, apply and evaluate the importance of measures to protect stored products againststorage pests.
2. Assess and evaluate the presence of populations of stored product pests in practice.
3. Rank and compare indicators of the possible occurrence of resistance to insecticides, fumigantsand rodenticides.
4. Identify and select newer methods and procedures in the storage pest control.
5. Evaluate the ecological and conventional approach in the stored products protection.
6. Recommend the most acceptable methods of controlling storage pests for practice.

Module content
Determination of species, biology and ecology of storage insects (primary, secondary, mycophagous, incidental species), mites, rodents and birds. Identifying damage to stored products, hidden infection stored products. Micro-organisms that transmit mycophagous insects. Control methods of stored product pests (insects, mites, rodents, birds) most modern methods (preventive, alternative, curative measures), monitoring of pests in storage facilities, integrated pest management in storage facilities. Resistance of pests to insecticides, fumigants and rodenticides.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students write a final exam. Students are advised to prepare exams from required and recommending literature list.

Literature

Required reading:

1. Korunić, Z, (1990): Štetnici uskladištenih poljoprivrednih proizvoda, biologija, ekologija i suzbijanje. Gospodarski list. Zagreb.
2. Rees, D. (2004): Insects of stored products. CSIRO Publishing. Australia.
3. Sauer, D. B. (1992): Storage of cereal grains and their products. American Ass.of CerealChemists, Inc., St.Paul, Minnsota, USA.
4. Subramanyam, B., Hagstrum, D. H. (1996): Integrated management of insects in stored products. Marcel Dekker, Inc., New York, USA.

Recommended literature:

1. Zbornici radova Seminara DDD i ZUPP (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015) Korunić d.o.o. Zagreb.
2. Zbornici predavanja DDD Trajna edukacija za izvoditelje obvezatnih mjera dezinfekcije, dezinsekcije i deratizacije i osobe u nadzoru, Korunić d.o.o. Zagreb.
3. Novine u DDD i ZUPP djelatnosti - Insekticidi, fumiganti i rodenticidi u prometu u republiciHrvatskoj, 15. izdanje (2014), ISSN 1846-209, Korunić d.o.o. Zagreb

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-6	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Laboratory work	1.60	1-6	Studying literature, determination of speciesand growing in the laboratory	Checking the activities carried out through the oral interview and a review of bred species
Individual task	1.60	1-6	Literature studying, assignment individualwork	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-6	Literature studying, seminar preparation and presentation	Seminar examination andevaluation according to the pre-established criteria
Final exam	2.00	1-6	Preparing for exam bystudying required and recommended literature	Exam (written)
Total	6.00			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads

15 teaching hours ((lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10.00% from total of 6 ECTS)

Laboratory work = 1.60 ECTS ((40 hours/150 hours of total load x100 = 26.67% from total of 6 ECTS)

Individual task = 0.60 ECTS ((40 hours/150 hours of total load x100 = 26.67% from total of 6 ECTS)Seminar paper = 0.20 ECTS (5 teaching hours /150 hours of total load x100 = 3.33% from total of6 ECTS)

Final exam = 2.00 ECTS (50 hours of preparation/150 hours of total load x 100 = 33.33% from total of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Pests of Fruit Trees and Grape Vines**	
Module coordinator	Mirjana Brmež	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim
The knowledge about pests important for fruit trees and vineyards.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Show the most important pest insects in orchards and vineyards.
2. Describe the symptoms of an attack of harmful insect plantations.
3. Develop a plan of care per individual fruit species.
4. Develop a plan for the protection of the vineyard.
5. To assess the importance of biological control in the protection of fruit trees and vines.

Module content
Economicaly important pests of apple, pear, plum, sweet cherry, cherry, peach, apricot, strawberry, nuts, hazel-nut, raspberry, currant, goosberry, grape vine etc. Methods of collectinginsects, determination of pests through practical work. Plant protection in orchards and vineyards. Biological protection.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Ciglar, I. (1998): Integrirana zaštita voćnjaka i vinograda. Zrinski, d.d. Čakovec.
2. Ivezić, M. (2003): Štetnici vinove loze i voćaka. Grafika, Osijek.
3. Maceljski, M., Cvjetković, B., Ostojić, Z., Barić, B. (2006): Štetočinje vinove loze. Zrinski d.d.Čakovec.

Recommended literature:

Journals and scientific papers.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	5.2	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits

1ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads

15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)

Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x100 = 3.33% from total of 6 ECTS)

Final exam = 5.2 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66% fromtotal of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Insect Pests in Horticulture**	
Module coordinator	Ankica Sarajlić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 15, E - 0, S - 5

Module aim
Introduce the students to harmful insects and nematodes that occured in horticulture.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Show the most important pest insects and nematodes in horticulture.
2. Describe the symptoms of attack of harmful insect and nematode in horticulture.
3. Describe other pests in horticulture (mites, snails, millipedes, birds and mammals).
4. Develop a plan of protection of individual horticultural species.
5. To assess the importance of biological control in horticulture.

Module content
Harmful insects and nematodes in horticulture (Collembola, Orthoptera, Dermaptera, Hemiptera, Thysanoptera, Coleoptera, Diptera, Lepidoptera, Hymenoptera, Meloidogyne, Longidoridae)

Types of teaching

☒ lectures	☐ individual tasks
☒ seminars and workshops	☐ multimedia and network
☐ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Maceljski, M. i sur. (2004): Štetočinje povrća. Zrinski, Čakovec.
2. Pollini, A. (1989): La difesa delle piante da Orto. Edizioni Agricole.
3. Ivezić, M. (2008): Entomologija – kukci i ostali štetnici u ratarstvu. Grafika d.o.o.
4. Ivezić M. (2014): Fitonematologija, Grafika d.o.o. Osijek.
5. Dent, D. (1993): Insect pest management. CAB International. Redwood books, UK.
6. The keys for insect identification

Recommended literature:

Scientific and proffesional papers

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures a ndexercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	5.2	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads

15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)

Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x100 = 3.33% from total of 6 ECTS)

Final exam = 5.2 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66% fromtotal of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Urban Entomology**	
Module coordinator	Enrih Merdić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	Second	
Credits and teaching	ECTS credits	3
	Lecture hours (L+E+S)	L - 15, E - 0, S - 0

Module aim
Students should learn about insects which breed in urban envirinment, their mischievousnessand methods of control.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. List insects which breeds in urban environment.
2. Estimate insects which have the most negative impact to humans.
3. Analized monents whan urban insects should be controled.
4. Make list of most important urban insects.
5. Describe life cycle of most important urban insects.
6. Select most convinient methods for insect control.

Module content
Insects which lives in urban areas. Most common urban insects are pests. Lecture are deals withspecific groups of urban pests. Mosquitoes (Culicidae) life cycle, anthropophagic species, vector rule, methods of biological control. Ants (Formicidae) life cycle, species in urban areas, special accommodation for life in buildings, methods of control. Cockroaches (Blattidae) life cycle, characteristics of breeding sites, special life characteristic, control. Flies (Muscidae) life cycle numerousity, flying capabilities, control. In laboratory, morphological characteristic for determination will be shown.

Types of teaching

☐ x lectures	☐ x individual tasks
☐ seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will be in lectures. After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Clements, A. N. (1996): The biology of mosquitoes. Development, nutrition and reproduction.Chapman & Hall. London, New York, Tokio.

2. Ebeling, W. (1975): Urban entomology, University of California.
3. Robinson, W. H. (1998): Urban Entomology. Insects and mite in the human environmment.Chapman & Hall, London, New York.

Recommended literature:

1. Elzinga, R. J. (2000): Fundamentals of Entomology. Prentice Hall, Ney Jersey.
2. Millerg, G. T. (1992): Living in the Environment, Wadsworth Publishing Company, Belmont,California.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lecture	0.6	1-6	Literature studying, assignment work	conversation with students
Exam	2.4	1-6	Preparing for exam by studying required and recommended literature	written and oral exam
Total	3.0			

The way of calculating ECTS credits for certain activities:

Module carries 3 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)3 ECTS credits = 75 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (15 teaching hours/75 hours of total load x 100 = 20.00% from total of 3 ECTS)
Final exam = 2.40 ECTS (60 hours of preparation/75 hours of total load x 100 = 80.00% from totalof 3 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Pests of Vegetables**	
Module coordinator	Ankica Sarajlić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	4
	Lecture hours (L+E+S)	L - 10, E - 5, S -5

Module aim
The knowledge about pests of vegetables.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Show most important pest insects in vegetable growing.
2. Describe the symptoms of infestation by insect pests in vegetable growing.
3. Develop a plan to protect vegetable crops.
4. Create a collection of insects.

Module content
Coleoptera, Lepidoptera, Hymenoptera, Thysanoptera, Homoptera, Diptera, Heteroptera, entomophagous species that attack pests of vegetables. The problem of protection in vegetable growing. Through exercises and seminar work, students will actualize the most common problems in vegetable growing from harmful of insects, and will debate in finding solutions. Development of insect collections

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Maceljski, M. i sur. (2004): Štetočinje povrća. Zrinski, Čakovec.
2. Pollini, A. (1989): La difesa delle piante da Orto. Edizioni Agricole.
3. Ivezić, M. (2008): Entomologija – kukci i ostali štetnici u ratarstvu. Grafika d.o.o.

Recommended literature:

Journals and papers relevant to pests of vegetables

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-4	Literature studying, seminar preparationand presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	5.2	1-4	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	6	0		

The way of calculating ECTS credits for certain activities:

1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads

15 teaching hours (lectures + exercises) = 0,60 ECTS (15 teaching hours/150 hours of total load x100 = 10.00% from total of 6 ECTS)

Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x 100 =3.33 7% from total of 6 ECTS)Final exam = 5.20 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66 % from total of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Diseases of Ornamental Plants**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate university study of Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim

Introduction to the most important diseases of ornamental plants.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify the plant diseases based on symptomatology and morphological characteristics of pathogens.
2. Assessment of the impact of environmental factors on infection and disease incidence.
3. Predict the occurrence of diseases (plant diseases forecasting) and possible losses of yield and quality.
4. Design and propose the plant disease management.
5. Compare the effectiveness of different plant protection strategies.

Module content

During the course students will learn about the most important pathogens of ornamental plants(biology, ecology, epidemiology) in the open field and greenhouse. Laboratory research of pathogens; study of morphological, cultural and biometric characteristics. Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Jurković, D., Ćosić, J., Vrandečić, K. (2010): Bolesti cvijeća i ukrasnog bilja. Poljoprivrednifakultet u Osijeku.
2. Horst, K. R. (1983): Compendium of Rose Diseases. APS Press.

3. Daughtrey, M. L., Wick, R. L., Peterson, J. L. (1995): Compendium of Flowering Potted PlantDiseases. APS Press.
4. Chase, A. R. (1997): Compendium of Ornamental Foliage Plant Diseases. APS Press.
5. Horst, K. R., Nelson, P. E. (1997): Compendium of Chrysanthemum Diseases. APS

Press.Recommended literature:

1. Gullino, M. L., Katan, J., Garibaldi, A. (2012): Fusarium Wilts of Greenhouse Vegetables and Ornamental Crops. APS Press.
2. Scientific Journals (Plant Diseases, Phytopathology, Plant Pathology, etc.)

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Lab work	1.0	1,2	Literature studying, work in Lab	evaluation according to the pre-established criteria
Final exam	4.2	1-5	Preparing for exam by studying requiredand recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10.00% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (10 hours/150 hours of total load x 100 = 3.33 from total of 6 ECTS)
Lab work = 1.0 ECTS (25 hours/150 hours of total load x 100 = 16.67% from total of 6 ECTS)
Final exam = 4.2 ECTS (100 hours of preparation/150 hours of total load x 100 = 70.00% fromtotal of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Seed Diseases**	
Module coordinator	Karolina Vrandečić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 12, E - 5, S - 8

Module aim
Introduction to the seed borne diseases of arable and vegetable crops.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Identify the seed borne pathogens.
2. Assessment of the impact of environmental factors on seed infection.
3. Predict the occurrence of seed borne diseases and possible losses of yield and quality.
4. Design and propose the plant disease management against seed born pathogens.
5. Compare the different methods of identificaton for seed borne pathogens.

Module content
During the course students will learn about the most important pathogens of seeds (biology, ecology, epidemiology) and seed health testing methods (cereales, corn, soybean and sunflower). Laboratory research of pathogens; study of morphological, cultural and biometric characteristics. Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Mathur, S. B., Kongsdal, O. (2003): Common Laboratory Seed Health Testing Methods forDetecting Fungi. First Edition.

2. Hutchins, J. D., Reeves, J. C. (1997): Seed health testing: Progress towards the 21st century.CAB International.
3. Jovičević, B., Milošević, M. (1990): Bolesti semena. Dnevnik, Novi Sad.
4. Compendium of Soybean Diseases, Compendium of Wheat Diseases, Compendium of CornDiseases
5. Maceljski, M. i sur. (1997): Zaštita povrća od štetočinja. Znanje,

Zagreb.Recommended literature:

1. Journals (Plant Diseases, Phytopathology, Plant Pathology, etc.)

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.68	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.32	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Lab work	1.0	1,5	Literature studying, work in Lab	evaluation according to the pre-established criteria
Final exam	4.0	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
17 teaching hours (lectures + exercises) = 0.68 ECTS (17 teaching hours/150 hours of total load x100 = 11.33% from total of 6 ECTS)
Seminar paper = 0.32 ECTS (8 hours/150 hours of total load x 100 = 5.33% from total of 6 ECTS) Lab work = 1.0 ECTS (25 hours/150 hours of total load x 100 = 16.67% from total of 6 ECTS) Final exam = 4.0 ECTS (100 hours of preparation/150 hours of total load x 100 = 66.66% fromtotal of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Diseases of Tree Fruits and Grapevine**	
Module coordinator	Karolina Vrandečić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim

Introduction to the biological, environmental and epidemiological characteristics of tree fruits andgrapevine disease agents.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify the plant diseases based on symptomatology and morphological characteristics of pathogens.
2. Assessment of the impact of environmental factors on infection and disease incidence.
3. Predict the occurrence of diseases (plant diseases forecasting) and possible losses of yield and quality.
4. Design and propose the plant disease management.
5. Compare the effectiveness of different plant protection strategies.

Module content

The most important diseases of kernel fruits, stone fruits, berries and grapevine (biology, ecology, epidemiology). Laboratory research of pathogens; study of morphological, cultural and biometric characteristics. Integrated pest management for tree fruits and grapevine from diseases. Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Cvjetković, B. (2010): Mikoze i pseudomikoze voćaka i vinove loze. Zrinski d.d., Čakovec, 1-418.
2. Ciglar, I. (1998): Integrirana zaštita voćnjaka i vinograda. Zrinski d.d. Čakovec.

3. Jurković, D., Ćosić, J. (2003): Zaštita vinograda i voćnjaka od uzročnika bolesti. Veleučilište uPožegi.
4. Kišpatić, J. (1992): Bolesti voćaka i vinove loze. Agronomski fakultet

Zagreb.Recommended literature:

1. Magazines (Plant Diseases, Phytopathology, Plant Pathology, etc.).
2. Compendium of Stone Fruit Diseases. APS Press, 1995, 1-98.
3. Compendium of Raspberry and Blackberry Diseases and Insects. APS Press, 1991, 1-100.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-5	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Lab work	1.0	1-2	Literature studying,work in Lab	evaluation according to the pre-establishedcriteria
Final exam	4.2	1-5	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x 100 = 3.33% from total of 6 ECTS)
Lab work = 1.0 ECTS (25 hours/150 hours of total load x 100 = 16.67% from total of 6 ECTS)
Final exam = 4.2 ECTS (105 hours of preparation/150 hours of total load x 100 = 70.00% fromtotal of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Ecological Microbiology**	
Module coordinator	Suzana Kristek	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L -10 , E - 5, S - 5

Module aim
Get students acquainted with microorganisms in the environment.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Rank and compare the microbial community in a variety of environmental conditions.
2. Compare the environmental factors that affect the fate of microorganisms in the environment.
3. Assess the importance and role of beneficial microorganisms in agricultural production.
4. Propose the use of beneficial microorganisms in fertilization and crop protection.

Module content
Microbial communities. Life in a low concentration of nutrients. Physico-chemical conditions thataffect the fate of microorganisms in the environment. Microflora of aquatic environment. Microflora of soil environment. Extreme environment (environments with a high temperature, extremely acid environment, highly alkaline environment). Distribution and ecological relevance of endo and ecto mycorrhizal fungi.Plant growth spurred by bacteria. Useful microorganisms and plant resistance against pests and diseases. Processing of relevant scientific and professional articles related to application of modern methods in environmental microbiology.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students write a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Maier, R. M., Pepper, I. L., Gerba, C. P. (2009): Environmental Microbiology. Academic PressInc. San Diego.

2. Varnam, A. H., Evans, M. G. (2000): Environmental Microbiology. Manson Publishing Ltd.London.
3. Tate, R. L. (1995): Soil Microbiology. Wiley. New York.
4. Alef, K., Nannipieri, P. (1995): Methods in Applied Soil Microbiology and Biochemistry. Academic press Inc. San Diego.

Recommended literature:

1. van Elsas, J. D., Trevors J. T., Wellington, E. M. H. (1997): Modern Soil Microbiology. Marcel Dekker Inc. New York.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.60	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.20	1-4	Literature studying, seminar preparation and presentation	Seminar examination and evaluation according to the pre-established criteria
Final exam	5.20	1-4	Preparing for exam by studying required andrecommended literature	Exam (oral or written)
Total	6.00			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures) = 0,60 ECTS (15 teaching hours/150 hours of total load x 100 = 10.00% from total of 6 ECTS)
Seminar paper = 0,20 ECTS (5 hours/150 hours of total load x 100 = 3.33% from total of 6 ECTS)
Final exam = 5.20 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.67% from total of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Anatomy and Physiology of Infected Plants**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 10, E - 0, S - 5

Module aim
Introduction to the basic anatomical-morphological and physiological changes in infected plants.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Connect symptoms of the plant diseases to the type of anatomical changes.
2. Connect symptoms of the plant diseases with the kind of physiological disorders.
3. Assess the effect of anatomical and physiological changes of diseased plants on yield andquality.
4. Relate the influence of abiotic disease with the anatomical-physiological changes of plants.

Module content
Changes related with anatomy of diseased plants (cytopathology, histopathology, organopathology). Changes related with physiology of diseased plants (movement of water in diseased plants, respiration, metabolism of phenolic compounds and photosyntesis). Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Agrios, G. N. (1997, 2005): Plant Pathology. General Aspects. Academic Press, New York.
2. Kišpatić, J. (1992): Opća fitopatologija.
3. Šutić, D. (1995): Anatomija i fiziologija bolesnih biljaka.

Recommended literature:

1. Magazines (Plant Diseases, Phytopathology, Plant Pathology, etc)

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.4	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student'swork and assignments
Seminar	0.2	1-4	Literature studying, seminar preparationand presentation	Seminar examination and evaluation accordingto the pre-established criteria
Final exam	4.4	1-4	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits

1 ECTS credit = 25 workload hours (student's working hours)5 ECTS credits = 125 hours of module loads

10 teaching hours (lectures + exercises) = 0.40 ECTS (10 teaching hours/125 hours of total load x100 = 8% from total of 5 ECTS)

Seminar paper = 0.20 ECTS (5 hours/125 hours of total load x 100 = 4% from total of 6 ECTS)

Final exam = 4.4 ECTS (110 hours of preparation/125 hours of total load x 100 = 88.00% fromtotal of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Laboratory Methods in Mycology**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	4
	Lecture hours (L+E+S)	L - 0, E - 20, S - 0

Module aim
Introduction to laboratory work methods in phytopathology and mastering laboratory skills.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Select techniques and instruments for sampling.
2. Choose and prepare appropriate growth medium for fungal parasite.
3. Carry out biometrical measurements.
4. Identify fungal species according to morphology.

Module content
Preparation of growth medium for facultative parasite. Light microscopy, determination of fungi by a native preparation, fungi measurement, imaging and saving images to the PC Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☐ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Dhingra, O. D., Sinclair, J.B. (1986): Basic Plant Pathology Methods. CRC Press, USA.
2. Mühle, E., Wetzel, T., Franenstein, K., Fuchs, E. (1983): Praktikum zur Biologie und Diagnostikder Krankheitserreger und Schädlinge unserer Kulturpflanzen. S. Hirzel Verlag Leipzig.
3. Burgess, L. W., Liddell, C. M., Summerell, B. A. (1988):Laboratory manual for Fusarium

research. The University of Sydney.

Recommended literature:

1. Singleton, L. L., Mihail, J. D., Rush, C. M. (2001): Methods for Research on Soilborne Phytopathogenic Fungi. APS Press.
2. Barnett, H. L., Hunter, B. B. (1972): Illustrated Genera of Imperfect Fungi. Burgess PublishingCompany.
3. Cummins, G. B., Hiratsuka, Y. (2003): Illustrated Genera of Rust Fungi. APS Press.
4. Hanlin, R. T. (1992): Illustrated Genera of Ascomycetes. APS Press.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Exercises	0.8	1-4	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Lab work	1.2	1-4	Literature studying,work in Lab	evaluation according to the pre-established criteria
Final exam	2.0	1-4	Preparing for exam bystudying required and recommended literature	Exam (oral)
Total	4.0			

The way of calculating ECTS credits for certain activities:

Module carries 4 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)4 ECTS credits = 100 hours of module loads
20 teaching hours (exercises) = 0.80 ECTS (20 teaching hours/150 hours of total load x 100 = 20% from total of 4 ECTS)
Lab work = 1.2 ECTS (30 hours/100 hours of total load x 100 = 30% from total of 4 ECTS)
Final exam = 2.0 ECTS (50 hours of preparation/100 hours of total load x 100 = 50% from total of4 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Arable Crop Diseases**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate specialist study of Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, S - 5, E - 5

Module aim

Introduction to the diseases of stubble crops, maize, industrial crops and fodder.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Identify the plant diseases based on symptomatology and morphological characteristics of pathogens.
2. Assessment of the impact of environmental factors on infection and disease incidence.
3. Predict the occurrence of diseases (plant diseases forecasting) and possible losses of yield and quality.
4. Design and propose the plant disease management.
5. Compare the effectiveness of different plant protection strategies

Module content

During the course students will learn about the most important pathogens of stubble crops, maize, industrial crops and fodder (biology, ecology, epidemiology). Laboratory research of pathogens; study of morphological, cultural and biometric characteristics. Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Balaž, F. F., Balaž, J. S., Tošić, M. T., Stojšin, V. B., Bagi, F. F. (2010): Fitopatologija Bolestiratarskih i povrtarskih biljaka. Poljoprivredni fakultet Novi Sad.
2. Agrios, G. N. (1997, 2005): Plant Pathology. Academic Press, New York.

3. Jurković, D., Ćosić, J. (2004): Bolesti suncokreta. U knjizi Vratarić M. i sur. "Suncokret Helianthusannuus L." ,p. 283−323. Poljoprivredni institut Osijek.
4. Sinclair, J. B., Backman, P. A. (1993): Compendium of Soybean Diseases. APS Press.

Recommended literature:

1. Gladders, P., Ginsburg, D., Ritchie, F., Smith, J. A., Waterhouse, S., Tucker, C., Tonguc, L. (2008): The Encyclopedia of Oilseed Rape Diseases. BASF.
2. Kelly, C., Clark, B., Bryson, R., Jellis, G., Tonguc, L. (2009): The Encyclopedia of Cereal Diseases.BASF.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.2	1-5	Literature studying, seminar preparation and presentation	Seminar examination and evaluation accordingto the pre-established criteria
Lab work	1.2	1-2	Literature studying, work in Lab	evaluation according to the pre-established criteria
Final exam	4.0	1-5	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x 100 = 3.33 from total of 6 ECTS)
Lab work = 1.2 ECTS (30 hours/150 hours of total load x 100 = 20.00% from total of 6 ECTS)
Final exam = 4.0 ECTS (100 hours of preparation/150 hours of total load x 100 = 66.66% fromtotal of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Vegetable Diseases**	
Module coordinator	Jasenka Ćosić	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	All	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 10

Module aim
Introduction to the most important diseases of vegetables.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Identify the plant diseases based on symptomatology and morphological characteristics of pathogens.
2. Assessment of the impact of environmental factors on infection and disease incidence.
3. Predict the occurrence of diseases (plant diseases forecasting) and possible losses of yield and quality.
4. Design and propose the plant disease management.
5. Compare the effectiveness of different plant protection strategies.

Module content
During the course students will learn about the most important pathogens of vegetables (biology, ecology, epidemiology) and methods of their identification. Laboratory research of pathogens; study of morphological, cultural and biometric characteristics. Integrated disease management for vegetables. Students will receive suggestions of seminar paper titles, and recommendation of magazines with relevant scientific and professional articles, necessary for their paper writing, according to scientific interest of participants.

Types of teaching

☒ lectures	☐ individual tasks
☒seminars and workshops	☐ multimedia and network
☒ exercises	☒ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
All students will prepare for seminars and exercises using recommended reading literature. Students make individual seminar works, which they present orally in a twenty-minute period using PowerPoint presentation. Schedule of presentations will be arranged in advance. For laboratory work, students need emergency protective laboratory clothing (lab coat). After that, students have a final exam. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Balaž, F. F., Balaž, J. S., Tošić, M. T., Stojšin, V. B., Bagi, F. F. (2010): Fitopatologija Bolestiratarskih i povrtarskih biljaka. Poljoprivredni fakultet Novi Sad.
2. Koike, S. T., Gladders, P., Paulus, A. O. (2009): Vegetable Diseases A Color Handbook. Academic Press.

3. Zitter, T. A., Hopkins, D. L., Thomas, C. E. (2010): Compendium of Cucurbit Diseases. APS Press.
4. Rimmer, R. S., Shattuck, V. I., Buchwaldt, L. (2007): Compendium of Brassica Diseases. APS Press.

Recommended literature:

1. Blancard, D. (2000): A Colour Atlas of Tomato Diseases Observation, Identification and Control. Manson Publishing Ltd.
2. Gullino, M. L., Katan, J., Garibaldi, A. (2012): Fusarium Wilts of Greenhouse Vegetables andOrnamental Crops. APS Press.
3. Krstić, B. B., Bulajić, A. R. (2007): Karantinski virusi povrća i ukrasnih biljaka u zaštićenomprostoru. Univerzite u Beogradu - Poljoprivredni fakultet.
4. Scientific journals (Plant Diseases, Phytopathology, Plant Pathology, etc.)

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.6	1-5	Literature studying, assignment work	Checking student activity orally (conversation), reviewing student's work and assignments
Seminar	0.4	1-5	Literature studying, seminar preparation andpresentation	Seminar examination and evaluation according to thepre-established criteria
Lab work	1.0	1-2	Literature studying, work in Lab	evaluation according to the pre-established criteria
Final exam	4.0	1-5	Preparing for exam by studying required and recommended literature	Exam (oral)
Total	6.0			

The way of calculating ECTS credits for certain activities:
Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
15 teaching hours (lectures + exercises) = 0.6 ECTS (15 teaching hours/150 hours of total load x100 = 10% from total of 6 ECTS)
Seminar paper = 0.4 ECTS (8 hours/150 hours of total load x 100 = 6.66% from total of 6 ECTS)
Lab work = 1.0 ECTS (25 hours/150 hours of total load x 100 = 16.67% from total of 6 ECTS)
Final exam = 4.0 ECTS (100 hours of preparation/150 hours of total load x 100 = 66.66% fromtotal of 6 ECTS)

Module quality assessment
Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Monitoring and Management of Allergenic Plants**	
Module coordinator	Edita Stefanic	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	Second	
Credits and teaching	ECTS credits	5
	Lecture hours (L+E+S)	L - 15, E - 10, S - 0

Module aim
Get acquainted students with most important allergenic plants and options of their control.

Terms of admission
No prerequisites.

Expected learning outcomes
After completing the module, student will be able to:
1. Identify allergenic plants in Republic of Croatia.
2. Interpret phenology of allergenic plants.
3. Distinguish and compare influence of meteorological parameters on pollen presence in the air.
4. Explain the structure of pollen grains.
5. Distinguish pollen grains under microscope and present results.
6. Create and select economically acceptable progrem of management of allergenic weeds.

Module content
Allergenic plants in Republic of Croatia, spread and phenology, Influence of climatic conditions on pollen presence in the air; Structure of pollen grains, Methods, microscopy and presentationof results, Management of allergenic plant.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements
Students are obliged to atend lectures and exercises. Each student individualy prepare monitoring tape, permanent slides, microscope and analyze obtained results. At the end of semester students have written examination. Students are advised to prepare exams from required literature list.

Literature
Required reading:

1. Grant Smith, E. (1990): Sampling and identifying allergenic pollens and molds. San Antonio,Texas.
2. Moore, P. D., Webb, J. A., Collins, M. E. (1983): Pollen analysis. Blackwell Scientific Publications.
3. Štefanić, E. (predavanja).
4. Regione Emilia-Romagna (1994): Monitoraggio aerobiologico in Emilia-Romagna, contributi 30,Unita' Sanitaria Locale n. 31-Ferrara.

Recommended literature:

1. Winkler, H., Ostrowski, R., Wilhem (1993): Pollenbestimmungbuch der Stiftung DeutscherPolleninformationsdienst. TAKT- Verlag
2. British Aerobiology Federation (1995): A guide to trapping pollen and spores. ISBN 0-9525617-0-0.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-6	Literature study	Checking student activity orally (conversation), reviewing student's work and assignments
Exercises	0.4	4-5	Literature studying, preparation and analyze of microscopic slides	Review of obtained results
Final exam	4.0	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	5.0			

The way of calculating ECTS credits for certain activities:

Module carries 5 ECTS credits
1ECTS credit = 25 workload hours (student's working hours)
5 ECTS credits = 125 hours of module loads
15 teaching hours (lectures) = 0.60 ECTS (15 teaching hours/125 hours of total load x100 = 12.00% from total of 5 ECTS)
Exercises = 0.40 ECTS (10 hours/125 hours of total load x100 = 8.00% from total of 5 ECTS)
Final exam = 4.0 ECTS (100 hours of preparation/125 hours of total load x 100 = 80.00% from total of 5 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Pesticide Application and Legislation**	
Module coordinator	Renata Baličević	
Study programme	Postgraduate university study of Plant Protection	
Module status	Elective module	
Year of studies	Second	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 0, S - 10

Module aim

Introduction of participants with methods of pesticide application, legislation on sustainable pesticide use in the world and Croatia.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Appoint different groups of pesticides including plant protection products.
2. Compare physicochemical properties and toxicology of plant protection products.
3. Distinguish restrictions in the use of pesticides.
4. Classify formulations of plant protection products.
5. Apply safety measures when working with pesticides and prevent environmental contamination.

Module content

Techniques of pesticide application, equipment for application of pesticides, the impact of climate factors on the application, drift, undesirable side effects in the application, legislation related to the manufacture, distribution, registration, application of pesticides. Inspection tasks related to the marketing and use of pesticides.

Types of teaching

☒ lectures	☒ individual tasks
☒seminars and workshops	☐ multimedia and network
☐ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are expected to attend classes and participate actively in the tasks during the lectures. All students are obliged to prepare for lectures and seminars by studying of relevant literature. Students are obliged to prepare and write seminar paper. Seminar paper should be present orally for about 20 minutes with a Power Point Presentation. Schedule of presentation will be arranged in advance. After that, students write a final exam. Students are advised to prepare exams from required literature.

Literature

Required reading:

1. Baličević R., Ravlić M. (2014): Herbicidi u zaštiti bilja, priručnik, Sveučilište J. J. Strossmayera, Poljoprivredni fakultet u Osijeku.

2. Bagi, F., Bodnar, K. (2012): Fitomedicina, Univerzitet u Novom Sadu, Poljoprivredni fakultet.
3. Šovljanski, R., Lazić, S. (2007): Osnovi fitofarmacije, Univerzitet u Novom Sadu, Poljoprivrednifakultet.

Recommended literature:

Published scientific papers in reference journals and proceedings.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.4	1-5	Reading reqired literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Seminars	0.4	5	Studying the requiredliterature, writing and presentation of seminar paper	Review and evaluation of seminar paper according to pre-defined criteria.
Student activity	1.6	1-5	Interactive participation in lectures through problem-solving tasks.	Assessment of the activities carried out through conversation
Final exam	3.6	1-5	Exam preparation through studying therequired and recommended literature	Exam (written or oral)
Total	6			

The way of calculating ECTS credits for certain activities:
Module has 6 ECTS credits
1 ECTS credit = 25 workload hours (hours of student work)
6 credits = 150 workload hours
10 lecture hours (lectures) = 0.4 ECTS (10 lecture hours /150 workload hours x 100 = 6.67% of total 6 ECTS)
Seminar = 0.4 ECTS (10 seminar hours /150 workload hours x 100 = 6.67% of total 6 ECTS)
Student activity = 1.6 ECTS (40 seminar hours /150 workload hours x 100 = 26.66% of total 6 ECTS)
Final exam = 3.6 ECTS = (90 hours / 150 workload hours x 100 = 60% of total 6 ECTS)

Module quality assessment
The evaluation of lecturer and module quality through anonymous surveys.

Module name	**Weed Communities in Agriculture**	
Module coordinator	Edita Štefanić	
Study programme	Postgraduate specialist study Plant protection	
Module status	Elective module	
Year of studies	Second	
Credits and teaching	ECTS credits	6
	Lecture hours (L+E+S)	L - 10, E - 5, S - 5

Module aim

Acomplish basic knowledge about weed vegetation in different crops

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe morphology of weed commuinities.
2. Identify and interpret factors that influences on habitat.
3. Understand the life cycle of weeds.
4. Interpret relationships in agrosystems.
5. Apply current methods of weed mapping and monitor of weed communites.
6. Recognize weed communities in the fields.

Module content

Significance of phytocosiology in agriculture. Morphology of weed communities. Sintaxonomic units of vegetation. Sinecology of habitats. Sinecology of reproduction and dispersal. Relationships in agroecosystems. Weed flora in cereals and row crops (on fields, horticulture, orchards and vineyards) and ruderal areas. Weed mapping and monitoring of changes in weed comminities and their habitats. Introduction of weed communities on teh fields.

Types of teaching

- ☒ lectures
- ☒ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are obliged to atend lectures and to be prepared for seminars and individual tasks by studying required and recomended literature, Each student pick out topic for individual seminar and are responsible to deliver it in written form on given time. Also, each student present their work orally in 15 min. period using Power Point presentation. At the end of semester students have written examination. Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Moodle (PFOS_WS) – E. Štefanić -predavanja.
2. Skender, A. (1990): Fitocenologija u spontanim i antropogenim ekosustavima. Sveučllište J.J.Strossmayera u Osijeku, Poljoprivredni fakultet, Osijek

3. Barbour, M. G., Burk, J. H., Pitts, W. D. (1987): Terrestrial plant ecology. The Benjamin/Cummings Publishing Company, Inc.

Recommended literature:

1. Hulina, N. (1998): Korovi. Školska knjiga, Zagreb.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.40	1-6	Literature study	Checking student activity orally (conversation), reviewing student'swork and assignments
Seminars	0.20	1-6	Literature studying, seminar preparationand presentation	Seminar examination andevaluation according to thepre-established criteria
Individual tasks	0.20	5-6	Individual tasks	Deliver and check of individual tasks
Final exam	5.20	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	6			

The way of calculating ECTS credits for certain activities:

Module carries 6 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)6 ECTS credits = 150 hours of module loads
10 teaching hours (lectures + exercises) = 0.40 ECTS (10 teaching hours/150 hours of total load x100 = 6.66% from total of 6 ECTS)
Seminar paper = 0.20 ECTS (5 hours/150 hours of total load x100 = 3.33% from total of 6 ECTS)
Individual tasks = 0.20 ECTS (5 hours/150 hours of total load x 100 = 3.33% from total of 6 ECTS)Final exam = 5.20 ECTS (130 hours of preparation/150 hours of total load x 100 = 86.66% fromtotal of 6 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

Module name	**Plant Protection Program Design**	
Module coordinator	Renata Baličević	
Study programme	Postgraduate specialist study Plant Protection	
Module status	Elective module	
Year of studies	First	
Credits and teaching	ECTS credits	4
	Lecture hours (L+E+S)	L - 15, E - 5, S -0

Module aim

Creating a plant protection program for individual crops in the most acceptable way consideringthe sustainable use of pesticides.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Classify plant protection measures in crops.
2. Separate chemical and non-chemical control measures.
3. Calculate the dose and concentration of plant protection product.
4. Compare the threshold of cost-effectiveness and designed protection plan.
5. Design and present a plant protection program of the selected crop.

Module content

Plant protection products - classification, properties (toxicity, formulation, effect, decomposition, residues), application (application time, method, dose, concentration), labeling, handling, legislation of Republic of Croatia.

Types of teaching

☒ lectures	☐ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are expected to attend classes and participate actively in the tasks during the lectures and exercises. All students are obliged to prepare for lectures and exercises by studying of relevant literature. After that, students write a final exam. Students are advised to prepare exams from required literature. For laboratory work students are required to wear protective clothing.

Literature

Required reading:

1. Glasilo biljne zaštite. Hrvatsko društvo biljne zaštite. Zagreb.
2. Baličević, R., Ravlić, M. (2013): Fitofarmacija, interna skripta za studente Poljoprivrednogfakulteta u Osijeku.
3. Maceljski, M. i sur. (2002): Priručnik iz zaštite bilja, Zagreb.

Recommended literature:

1. Published scientific papers in reference journals and proceedings.
2. Plant protection programs for crops – from pesticide suppliers in Croatia.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.8	1-5	Reading reqired literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Preparation forlaboratory exercises	0.2	3-4	Reading reqired literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Student activityduring lectures	0.6	1-5	Interactive participation in lectures through problem-solving tasks.	Assessment of the activities carried out through conversation
Final exam	2.4	1-5	Exam preparation through studying the required and recommended literature	Exam (written ororal)
Total	4			

The way of calculating ECTS credits for certain activities:

Module has 4 ECTS credits

1 ECTS credit = 25 workload hours (hours of student work)10 credits = 100 workload hours

15 lecture hours (lectures, excercises + student activity) = 1.6 ECTS (20 lecture hours + 5 hours reparation for laboratory excercises + 15 hours of preparation for lectures (activity) /100 workload hours x 100 = 40.0% of total 4 ECTS

Final exam = 2.4 ECTS = (60 hours / 100 workload hours x 100 = 60% of total 4 ECTS)

Module quality assessment

The evaluation of lecturer and module quality through anonymous surveys.

Module name	**Plant Protection in Protected Areas**	
Module coordinator	Marija Ravlić	
Study programme	University specialist study Plant Protection	
Module status	Elective module	
Year of studies	Secound	
Credits and teaching	ECTS credits	4
	Lecture hours (L+E+S)	L - 15, E - 5, S- 0

Module aim

Introduction of participants with the basic principles and standards of agriculture in environmentally sensitive areas (protected) areas, organic and sustainable agriculture, especially methods, measures and plant protection products allowed in organic production according to Croatian and international standards

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Define the basic principles of environmentally acceptable plant protection.
2. Describe direct and indirect measures of environmentally acceptable plant protection.
3. Classify biopesticide applicable in plant protection.
4. Apply the rules and laws of integrated pest management, compare plant protection measuresin conventional, integrated and organic agricultural production.

Module content

History, principles and standards in sustainable and organic agriculture; agro-technical, physical, chemical and biological methods of plant protection allowed in organic production; protected areas with limited production conditions (nature parks, water protection zones).

Types of teaching

- ☒ lectures
- ☐ seminars and workshops
- ☒ exercises
- ☐ distance education
- ☐ field work
- ☐ individual tasks
- ☐ multimedia and network
- ☐ laboratory
- ☐ mentoring
- ☐ other

Student requirements

Students are expected to attend classes and participate actively in the tasks during the lectures and exercises. All students are obliged to prepare for lectures and exercises by studying of relevant literature. After that, students write a final exam. Students are advised to prepare exams from required literature. For laboratory work students are required to wear protective clothing.

Literature

Required reading:

1. Igrc Barčić, J., Maceljski, M. (2001): Ekološki prihvatljiva zaštita bilja od štetnika, Zrinski,Čakovec.
2. Kisić, I. (2014): Uvod u ekološku poljoprivredu, Agronomsk fakultet Sveučilišta u Zagrebu.

3. Znaor, D. (1996): Ekološka poljoprivreda, Nakladni zavod Globus,

Zagreb.Recommended literature:

Published scientific papers in reference journals and proceedings.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures and exercises	0.8	1-4	Reading reqired literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Preparation for laboratory exercises	0.2	2-4	Reading reqired literature, tasks solving	Assessment of the activities carried out through conversation, submission and review of completed tasks.
Student activity during lectures	0.6	1-5	Interactive participation in lectures through problem-solving tasks.	Assessment of the activities carried out through conversation
Final exam	2.4	1-4	Exam preparation through studying therequired and recommended literature	Exam (written or oral)
Total	4			

The way of calculating ECTS credits for certain activities:

Module has 4 ECTS credits

1 ECTS credit = 25 workload hours (hours of student work)10 credits = 100 workload hours

15 lecture hours (lectures, excercises + student activity) = 1.6 ECTS (20 lecture hours + 5 hours reparation for laboratory exercises + 15 hours of preparation for lectures (activity) /100 workloadhours x 100 = 40.0% of total 4 ECTS

Final exam = 2.4 ECTS = (60 hours / 100 workload hours x 100 = 60% of total 4 ECTS)

Module quality assessment

The evaluation of lecturer and module quality through anonymous surveys.

Module name	**Weed Control Economics**	
Module coordinator	Edita Stefanic	
Study programme	Postgraduate specialist study of Plant Protection	
Module status	Elective module	
Year of studies	Secound	
Credits and teaching	ECTS credits	3
	Lecture hours (L+E+S)	L - 10, E - 5, S - 0

Module aim

Finding economically efficient strategy for weed control in conventional, integrated and ecological crop production.

Terms of admission

No prerequisites.

Expected learning outcomes

After completing the module, student will be able to:

1. Describe and band interaction between crops and weeds.
2. Identify crop management system and weed management.
3. Distinguish and compare short and longterm aspect of weed control.
4. Explain decision model any yield loss function.
5. Estimate economic effect of weed control in various crops.
6. Create and select economically acceptable progrem of weed control in various crops.

Module content

Weed sucess criteria compared to crops, crop- weed interaction, yield loss function, impact of herbicide application, regional and social aspect of weed management, precision farming, low-term aspect of weed management, long-term aspect of weed management, crop management system and weed management, decision models - support to effective weed control, assessments of economic weed control.

Types of teaching

☒ lectures	☒ individual tasks
☐ seminars and workshops	☐ multimedia and network
☒ exercises	☐ laboratory
☐ distance education	☐ mentoring
☐ field work	☐ other

Student requirements

Students are obliged to atend lectures and to be prepared for individual tasks by studying required and recomended literature, Students are advised to prepare exams from required literature list.

Literature

Required reading:

1. Moodle (PFOS_WS) – E. Štefanić –lectures.
2. Anderson, W.P. (1993): Weed Science - principles and applications, 3. edition. WestPublishing Company, Minneapolis/St.Paul, New York, Los Angeles, San Francisko.
3. Oerke, E. C. C., Weber, A., Dehne, H. W., Schonbeck, F. (1994): Crop Production and Crop

Protection: Estimated Losses in Major Food and Cash Crops. Elsevier Science & Technology Books, 830pp.
4. Reichelderfer, K. H., Norton, G. A., Carlson, G. A. (1984): Economic Guidelines for Crop PestControl. Bernan Associates, 89pp.

Recommended literature:

1. Pimentel,D. (1997): Techniques for Reducing Pesticide Use: Economic and Environmental Benefits. Wiley, John & Sons, Incorporated, 456pp.

Correlating learning outcomes with teaching methods

Teaching activity	ECTS credits	Learning outcomes	Student activity	Assessment methods
Lectures	0.60	1-6	Literature study	Checking student activity orally (conversation), reviewing student's work and assignments
individual tasks	0.60	5-6	Individual tasks	Deliver and check of individual tasks
Final exam	1.80	1-6	Preparing for exam bystudying required and recommended literature	Exam (oral or written)
Total	3			

The way of calculating ECTS credits for certain activities:

Module carries 3 ECTS credits
1 ECTS credit = 25 workload hours (student's working hours)3 ECTS credits = 75 hours of module loads
15 teaching hours (lectures + exercises) = 0.60 ECTS (15 teaching hours/75 hours of total load x100 = 20.00% from total of 3 ECTS)
Individual tasks = 0.60 ECTS (15 hours/75 hours of total load x 100 = 6.66% from total of 3 ECTS) Final exam = 1.80 ECTS (45 hours of preparation/75 hours of total load x 100 = 60.00% from totalof 3 ECTS)

Module quality assessment

Evaluation of teacher's work and evaluation of mentioned module's quality via anonymous student surveys.

After completing the study, student will be able to:

Learning Outcome 1	Identify the plant pathogens, pests and weeds in cereals and arable crops production, vegetables, ornamentals, fruits and grape production
Learning Outcome 2	Predict the intensity of diseases and pests (plant diseases forecasting) and weed population and possible losses of yield and quality
Learning Outcome 3	Design and propose a plant disease protection, pests and weed management plan depending on the plant species and production technology
Learning Outcome 4	Compare the effectiveness of different plant protection strategies
Learning Outcome 5	Identify the goals of proper application of plant protection products depending on the current requirements of producers, processors and consumers within the legal framework
Learning Outcome 6	Prepare and analyse samples using standard phytopatological, entomological, nematological and herbological lab methods
Learning Outcome 7	Apply the rules and laws of integrated pest management, compare plant protection measures in conventional, integrated and organic agricultural production