DEPARTMENT FOR PLANT AND ENVIRONMENTAL PROTECTION
Study programme: PHYTOMEDICINE
Degree: Master of Agricultural sciences – PHYTOMEDICINE

Code	I SEMESTER – first year			
	C O U R S E	**Credits**	**Lectures**	**Total**
2ZF230112	Methods in scientific research work	8	3+2+2	216
2ZF200112	Phytopharmacy	8	3+2+2	216
2ZF230212	Biostatistics	6	2+2+1	156
	Faculty elective course	4	2+1+1	120
	Faculty elective course	4	2+1+1	120
	Total:	30	12+8+7	828

Code	II SEMESTER – first year			
	C O U R S E	**Credits**	**Lectures**	**Total**
2ZF200212	Anatomy and physiology of diseased plants	8	3+2+2	216
2ZF200312	Plant resistance	8	3+2+2	216
2ZF200412	Laboratory practice 1	6	2+2+1	156
	Faculty elective course	4	2+1+1	120
	Faculty elective course	4	2+1+1	120
	Total:	30	12+8+7	828

Code	III SEMESTER – second year			
	C O U R S E	**Credits**	**Lectures**	**Total**
2ZF200512	**Biological control**	8	3+2+2	216
2ZF200612	Laboratory practice 2	8	3+2+2	216
2ZF200712	Molecular biology	8	3+2+2	216
	University elective course	6	2+2+1	156
	Total:	30	11+8+7	804

Code	IV SEMESTER – second year			
	C O U R S E	**Credits**	**Lectures**	**Total**
	Master thesis	30	0+0+26	818
	Total:	30	0+0+26	818
Code	***Faculty elective course 1 semester***			
2ZF200812	General phytopathology	4	2+1+1	120
2ZF200912	General entomology	4	2+1+1	120
2ZF201012	General herbology	4	2+1+1	120
2ZF201112	Mycology	4	2+1+1	120
	Faculty elective course 1 semester			
2ZF201212	Virology	4	2+1+1	120
2ZF201312	Bacteriology	4	2+1+1	120
2ZF201412	Special entomology	4	2+1+1	120
2ZF201512	Special herbology	4	2+1+1	120

Appendix No.3	**Subject programmeme from first, second and third cycle studies**	
1.	**Course title**	**METHODS IN SCIENTIFIC RESEARCH WORK**
2.	**Course code**	**2ZF230112**
3.	**Study programme**	**Phytomedicine**

4.	**Organizer of the study programme (faculty, institute, group)**	“Goce Delcev”University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection				
5.	**Level (first, second, third cycle)**	Second cycle				
6.	**Academic year / semester**	First year / I semester	7.	Number of ECTS credits	8	
8.	**Professor**	**Prof. Ilija Karov, PhD**				
9.	**Preconditions for course enrollment**	No				
10.	**Goals of the course programme:** Introduction to the basic rules and principles in science, the scientific research methods and characteristics that should possess the scientific worker.					
11.	**Content of the course programme:** **Content of the lectures:** 1. Importance of scientific research 2. Selection of themes for scientific work, 3. Methodology of research 4. Literature and working hypothesis 5. Planning of experiment 6. Conducting of the experiment 7. Methodology and experimental technique of field experiment 8. An overview of important procedures in the experimental technique 9. Methodology and technique of conducting experiments in containers 10. Processing and displaying the results 11. Technique of writing master's, specialist and scientific papers and citing the literature 12. Preparation of a scientific paper for printing. **Content of exercises**: 1. Introduction 2. Setting the hypothesis 3. Studying the literature 4. Performing of experiment 5. Field trials 6. Laboratory experiments 7. Experiment in containers 8. Processing of the experimental results 9. Displaying obtained results 10. Literature citation, 11. Writing a scientific paper 12. Presenting a scientific paper.					
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, independent paper work, home learning, preparatory classes for exams and mid-term tests, consultations.					
13.	**Total amount of available time**	216 hours				
14.	**Distribution of the available time**	3+2+2				
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3		
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2		
16.	**Other forms of activities**	16.1.	Team projects	1		
		16.2.	Individual projects	1		
		16.3.	Individual study			
17.	**Forms of assessment**					
	17.1.	Exams (midterm exams, exam, electronic testing)	30			
	17.2.	Project activities (oral and written presentation)	50			
	17.3.	Other forms of studying activities	20			
18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)			
		from 51 to 60 points	6 (six) (E)			
		from 61 to 70 points	7 (seven) (D)			
		from 71 to 80 points	8 (eight) (C)			
		from 81 to 90 points	9 (nine) (B)			
		from 91 to 100 points	10 (ten) (A)			

19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities, attending the lectures and discussions			
20.	**Language in which classes are conducted**		Macedonian			
21.	**Method of monitoring the quality of instruction**		Self-evaluation			
22.	**Literature**					
	22.1.	**Compulsory literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Проф. д-р. Илија Каров, Асс. Билјана Ковачевиќ	Методи на научно истражувачката работа (скрипта)	УГД-Штип	2010
		2.	Ketryn L. Allen	Study skills. A student survival guide. (translation of the Macedonian language)	Goce Delcev University, Stip	2010
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Dr. Slavko Borojevic	Metodologija eksperimentalnog naucnog rada	Radnicki Univerzitet “Radivoj Cirpanov“	1974

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**PHYTOPHARMACY**			
2.	**Course code**	**2ZF200112**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	“Goce Delcev”University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year/ I semester	7.	Number of ECTS credits	8
8.	**Professor**	**Prof Ilija Karov, PhD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** Introduction to the fundamentals, principles and rules of phytopharmacy, divisions of pesticides, introduction to biochemical properties of pesticides, method of action, toxicity and opportunities for application.				
11.	**Content of the course programme:** **Content of the lectures:** 1.Introduction and historical development of pesticides; 2. Classification of pesticides; 3. Forms of production of pesticides; 4. Toxicity of pesticides to man and animals; 5. Toxicity: parameters of toxicity, carenza, tolerance and phytotoxicity; 6. Resistance; 7.				

	Fate of pesticides in the environment; 8. Movement of pesticides in plants; 9. Fungicides; 10. Insecticides; 11. Herbicides; 12. Antibiotics, rodenthicides, limacides, korvicides and acaricides; **Content of exercises:** 1. Pesticide formulation; 2. Physico-chemical properties of pesticides; 3. Legislation 4. Determination of maximum permitted concentration 5. Application of pesticides 6. Methods for determination of pesticide residues 7. Taking a sample for testing of pesticide residues in different samples, 8. Calibration of the apparatus work (GC / MS / MS); 9. Preparation of test sample: liquid-liquid extraction of pesticides from different samples, 10. Determination of pesticide residues in plant sample with GC; 11. Determination of pesticide residues in plant sample with GC / MS / MS; 12. Protecting people and the environment from harmful effects of pesticides;				
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, making independent paper work, home teaching, consultancy.				
13.	**Total amount of available time**		216 hours		
14.	**Distribution of the available time**		3+2+2		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2	
16.	**Other forms of activities**	16.1.	Team projects	1	
		16.2.	Individual projects	1	
		16.3.	Individual study		
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)	30		
	17.2.	Project activities (oral and written presentation)	50		
	17.3.	Other forms of studying activities	20		
18.	**Criteria for assessment (points / grade)**		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities, attending the lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		

22. **Literature**

Compulsory literature

	Ordinal No.	Author	Title	Publisher	Year
22.1.	1.	Проф д-р. Бранко Балтовски	Фитофармација	Наша книга, Скопје	1981
	2.	Проф. д-р. Филип Пејчиновски и Проф. Д-р. Саша Митрев	Општа Фитопатологија	УГД-Штип	2007
	3.	Milan Maceljski	Fitofarmacija (opći dio)	Sveučilište u Zagrebu	1967
		Radmila Šovljanski,	Praktikum iz Opšte	Poljoprivredni	2002

			Zlata Klokočar Šmit, Sanja Lazić	Fitofarmacije	fakultet, Novi Sad	
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Milan Maceljski, Bogdan Cvjetkovic, Jasminka I. Barcic, Zvonimir Ostojic	Prirucnik iz zastite bilja	Tiskara MDZagreb	1997

Appendix No.3	**Syllabus for the first, second and third cycle of study**					
1.	**Course title**	**BIOSTATISTICS**				
2.	**Course code**	**2ZF230212**				
3.	**Study programme:**	**Phytomedicine**				
4.	**Organizer of the study programme (faculty, institute, group)**	Department for plant and environmental protection Faculty of Agriculture University “Goce Delcev”- Stip.				
5.	**Level (first, second, third cycle)**	Second cycle				
6.	**Academic year / semester**	Second year/ I semester	7.	**Number of ECTS credits**	6	
8.	**Instructor**	**Prof. Tatjana Atanasova Pacemska, PhD**				
9.	**Preconditions for course enrollment**					
10.	**Goals of the course programme**: Gaining more detailed knowledge about the use of statistical methods in agricultural practice					
11.	**Content of the course programme**: **Content of the lectures:** 1. Introduction to statistics (mathematics and statistics science) 2. Basic statistical techniques 3. Types of statistical methods 4. Data processing 5. Statistics, variability and distribution 6. Discrete equal distribution. 7. Elements of statistical conclusion. 8. T test and F test 9. Analysis of variance (ANOVA) 10. Factorial experiment, two factorial experiment 11. Linear regression and correlation 12. Experimental Design - practical application of methods in agricultural research. **Content of exercises:** 1. Mathematics and statistics science 2. The use of basic statistical techniques 3. Types of statistical methods 4. Practical ways of data processing 5. Statistics, variability and distribution 6. Discrete equal distribution. 7. Elements of statistical conclusion. 8. T test and F test 9. Analysis of variance (ANOVA) 10. Factorial experiment, two factorial experiment 11. Linear regression and correlation 12. Experimental Design - practical application of methods in agricultural research.					
12.	**Methods of study**: Lectures, theoretical and practice exercises, consultations; individual work; home learning; preparatory classes for exams and mid-term tests: consultation;					
13.	**Total amount of available time**	156 hours				
14.	**Distribution of the available time**	2+2+1				
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2		
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2		
16.	**Other forms of activities**	16.1.	Team projects	1		

		16.2.	Individual projects	-
		16.3.	Individual study	-

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities or minimum 42 points from 2 midterm exams, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation	

22. **Literature**

Compulsory literature

	Ordinal No.	Author	Title	Publisher	Year
22.1.	1.	Graham Currell, Antony Dowman	Essential mathematics and statistics for science		2009
	2.	Nelmut van Emden	Statistics for terrified biologists		2008
	3.	Calvin Dytham	Choosing and Using Statistics		2003

Appendix No.3	**Syllabus for the first, second and third cycle of study**

1.	**Course title**	**ANATOMY AND PHYSIOLOGY OF DISEASED PLANTS**			
2.	**Course code**	**2ZF200212**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	“Goce Delcev”University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year / II semester	7.	Number of ECTS credits	8

8.	**Professor**		**Prof. Sasa Mitrev , PhD**	
9.	**Preconditions for course enrollment**		No	
10.	**Goals of the course programme:** Studying the changes in the structure of plants due to the presence of pathogens			
11.	**Content of the course programme:** **Content of the lectures:** 1. Study anatomy of diseased plants 2. Patocithology - sick plant cell infection under citogenesis 3. Cytoplasmatic changes - hypoplasia and hyperplasia, citotrophic changes - wasting hypertrophy 4. Citohromatic changes 5 Citonekrotic, citohormon changes 6. Pathogens in the cells of plants 7. Patohistology - types of pathologically changes 8. Patohistology - pathologically changes in certain tissues 9. Physiology of sick plants - permeability of diseased plant cells 10. Physiology of diseased plants - mineral nutrition of plants 11. Physiology of diseased plants - photosynthesis and respiration in diseased plants 12. Physiology of diseased plants - synthesis of proteins in plants. **Content of exercises**: 1. Study anatomy of diseased plants - video materials - presentations 2. Patocithology - sick plant cell infection under citogenesis 3. Cytoplasmatic changes - hypoplasia and hyperplasia, citotrophic changes - wasting hypertrophy 4. Citohromatic changes 5 Citonekrotic, citohormon changes 6. Pathogens in the cells of plants 7. Patohistology - types of pathologically changes 8. Patohistology - pathologically changes in certain tissues 9. Physiology of sick plants - permeability of diseased plant cells 10. Physiology of diseased plants - mineral nutrition of plants 11. Physiology of diseased plants - photosynthesis and respiration in diseased plants 12. Physiology of diseased plants - synthesis of proteins in plants.			
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, independent paper work, home learning, preparatory classes for exams and mid-term tests, consultations.			
13.	**Total amount of available time**		216 hours	
14.	**Distribution of the available time**		3+2+2	
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2
16.	**Other forms of activities**	16.1.	Team projects	
		16.2.	Individual projects	2
		16.3.	Individual study	

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	

20.	**Language in which classes are conducted**		Macedonian			
21.	**Method of monitoring the quality of instruction**		Self-evaluation			
22.	**Literature**					
	22.1.	**Compulsory literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – first part	Goce Delcev University, Stip	2007
		2.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – special part	Goce Delcev University, Stip	2009
		3.	Mitrev Sasa, Kostadinovska Emilija	Book for phytopathology exercise	Goce Delcev University, Stip	2010
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.				

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**PLANT RESISTANCE**			
2.	**Course code**	**2ZF200312**			
3.	**Study programme:**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	Department for plant and environmental protection Faculty of Agriculture University “Goce Delcev”- Stip.			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year/ second semester	7.	**Number of ECTS credits**	8
8.	**Instructor**	**Prof. Ilija Karov, PhD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme**: Students are introduced with the mechanisms of plant resistance to diseases, sources of resistance and creation of resistant varieties.				
11.	**Content of the course programme**: **Content of the lectures:** 1. Introduction to plant resistance to disease (resistant genes) 2. Genetics of plants resistance to disease 3. Resistance of populations 4. Resistant genes, perception and transduction of the elicitor signals of host - pathogen interactions; 5. Structural aspects of plant defense to disease; 6. Reaction of hypersensibility; 7.Antimicrobial components of induced resistance; 8.Sistematic induced resistance; 9. Inherited resistance 10. Creation of resistant varieties, 11. Induced and inherent antimicrobial proteins; 12. The meaning of plant disease resistance in agriculture. **Content of exercises:** 1.Introduction; 2.Antibiosis; 3. Antixenosis; 4. Tigmonasty, mimicry and camouflage; 5. Tolerance; 6. Tobacco plant resistance of *tobaco mosaic tobamovirus*; 7. Plant resistance of the family Cruciferae to the black rot; 8.Interaction between tomato and				

	Cladosporium fulvum; 9. Gene to gene - module system; 10. Interaction between barley and *Blumeria graminis*; 11. Creating resistant varieties; 12. Testing the resistance of certain varieties to specific pathogens.			
12.	**Methods of study**: Lectures, theoretical and practice exercises, consultations; individual work; home learning; preparatory classes for exams and mid-term tests: consultation;			
13.	**Total amount of available time**		216 hours	
14.	**Distribution of the available time**		3+2+2	
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2
16.	**Other forms of activities**	16.1.	Team projects	1
		16.2.	Individual projects	1
		16.3.	Individual study	-

17.	**Forms of assessment**			
	17.1.	Exams (midterm exams, exam, electronic testing)	50	
	17.2.	Project activities (oral and written presentation)	30	
	17.3.	Other forms of studying activities	20	
18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)	
		from 51 to 60 points	6 (six) (E)	
		from 61 to 70 points	7 (seven) (D)	
		from 71 to 80 points	8 (eight) (C)	
		from 81 to 90 points	9 (nine) (B)	
		from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**	60% of term activities		
20.	**Language in which classes are conducted**	Macedonian		
21.	**Method of monitoring the quality of instruction**	Self-evaluation		

22.	**Literature**					
	22.1.	**Compulsory literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Prof. d-r. Filip Pejcinovski and Prof. D-r. Sasa Mitrev	Agriculture Phytopathology (basic part)	UGD-Stip	2007
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	V.A. Shaklicova	Plant immunity	Moscow	2005
		2.	Dale Walters, Adrian Newton, Gary Lion	Induces resistance for plant defence. A	Blackwell Publishing	2007

				sustainable approach to crop protection		
		3.	F. Feldmann, D. V. Alford, C. Furk (EDS.)	Crop Plant Resistance to Biotic and Abiotic Factors: Current Potential and Future Demands	DPG Selbstverlag	2009

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**LABORATORY PRACTICE 1**			
2.	**Course code**	**2ZF200412**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	"Goce Delcev"University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First / II	7.	Number of ECTS credits	6
8.	**Professor**	**Prof. Sasa Mitrev, PhD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** acquisition of knowledge and practice in the laboratory				
11.	**Content of the course programme:** **Content of the lectures:** 1. Introduction to the general requirements for laboratory work and application of safety measures in the laboratory work 2. Ways of applying apparatus in the laboratory 3. Recognition and terminology of symptoms and diseases 4. Preparation of media for isolation of bacteria and fungi 5. Tests to identification the type of bacteria 6. Tests to determine the type of fungus 7. PCR technique for the diagnosis of type 8. RFLP technique for detection the gene type of pathogen 9. Microscopy technique using a light microscope and binocular 10. Technique using electron microscopy 11. Microscopic study of diseased material 12. Viruses - mechanical transmission of test plants **Content of exercises:** 1. Introduction to the general requirements for laboratory work and application of safety measures prescribed by the laboratory - rules of good laboratory practice 2. Ways of applying apparatus in the laboratory - a laboratory introduction to the work of each appliance 3. Recognition and terminology of symptoms and diseases - laboratory exercise on herbal plant material 4. Preparation of substrates for isolation of bacteria and fungi 5. Tests for identification and determination the type of bacteria 6. Tests to determine the type of fungus 7. PCR technique for the diagnosis of type 8. RFLP typing technique 9. Technique using a light microscope and Binocular 10. Technique using electron microscopy 11. Microscopic study of diseased material 12. Viruses - mechanical transmission test plant - video presentation				
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, making independent paper work, home teaching, consultancy.				
13.	**Total amount of available time**	156 hours			
14.	**Distribution of the available time**	2+2+1			

15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2
16.	**Other forms of activities**	16.1.	Team projects	
		16.2.	Individual projects	1
		16.3.	Individual study	

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation	

22. **Literature**

Compulsory literature

Ordinal No.	Author	Title	Publisher	Year
1.	Schaad N.W. Jones B.J. Chun W.	Laboratory guide for identification of plant pathogenic bacteria		2001
2.	Baucloin A.B.A.M., Hooper G.R. Mathre D.E. Carroll R.B.	Laboratory exercise in Plant Pathology: An Instruction Kit		1988

Additional literature

Ordinal No.	Author	Title	Publisher	Year
1.				

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**BIOLOGICAL PROTECTION**			
2.	**Course code**	**2ZF200512**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	Second / third 2012/13	7.	Number of ECTS credits	8

8.	**Professor**		**Prof. Dusan Spasov, PhD**	
9.	**Preconditions for course enrollment**		No	
10.	**Goals of the course programme:** Objective of the course is to familiarize students with the methods of biological control of the plants, to familiarize with the terms symbiosis, commensalism, competition, predation and parasitism, as well as types of predators and parasites.			
11.	**Content of the course programme:** **Content of the lectures:** 1. Introduction, brief historical review of biodiversity protection. Predation and parasitism - forms of biological struggle. 2. Mutual cultural relations between plants and pests - antibiosis and tolerance. 3. Mechanisms of regulation of populations of harmful insects and spiders; interspecies mechanisms. 4. Natural balance in biocenosis and agrobiocenosis. 5. Use of the entomophagous and acarophagous in biocenosis; Introduction of entomophagous and acarophagous in biocenosis. 6. Pathology of insects: viral, bacterial and fungal diseases of insects. 7. Parasitic nematodes: fam. Steinernematidae; fam. Mermithidae; fam. Allantonematidae; opportunities for use. 8. Epizootology of insect disease; Natural populations of entomophagous and acarophagous; Predatory stink bugs. 9. Predatory beetles: Coleoptera: Carabidae, Staphylinidae, Cicindelidae, Coccinelidae. 10. Predatory Neuroptera and Diptera: Neuroptera: Chrysopidae; Diptera: Cecidomyiidae, Syrphidae. 11. Parasitic insects: Ordinal Hymenoptera: Ichneumonidae, Braconidae, Aphidiidae, Aphelinidae, Trichogramatidae. 12. Opportunities for growing entomophagous and acarophagous in biolaboratory and their utilization. **Content of exercises:** 1. Bacterial diseases of insects. 2. Viral diseases of insects. 3. Fungal diseases of insects. 4. Parasitic nematodes. 5. Predatory stink bugs: Anthocoris nemorum. 6. Predatory stink bugs: Orius niger. 7. Predatory beetles: Coccinella septempunctata. 8. Predatory beetles: Adalia bipunctata. 9. Predatory beetles: Adonia variegata. 10. Predatory Neuroptera: Chrysopa spp. 11. Parasitic insects: Ordinal Hymenoptera: Aphelinidae: Encarsia formosa. 12. Protecting tomatoes from greenhouse withefly using Encarsia formosa on field.			
12.	**Methods of study:** Lectures, theoretic and field exercises, e-learning, individual and team projects, consultations.			
13.	**Total amount of available time**		216 hours	
14.	**Distribution of the available time**		3+2+2	
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2
16.	**Other forms of activities**	16.1.	Team projects	
		16.2.	Individual projects	1
		16.3.	Individual study	1
17.	**Forms of assessment**			
	17.1.	Exams (midterm exams, exam, electronic testing)		30
	17.2.	Project activities (oral and written presentation)		50
	17.3.	Other forms of studying activities		20
18.	**Criteria for assessment (points / grade)**		to 50 points	5(five) (F)
			from 51 to 60 points	6(six) (E)
			from 61 to 70 points	7(seven) (D)

		from 71 to 80 points	8(eight) (C)
		from 81 to 90 points	9(nine) (B)
		from 91 to 100 points	10(ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation	

22. **Literature**

22.1. **Compulsory literature**

Ordinal No.	Author	Title	Publisher	Year
1.	Prof. Dusan Spasov, Ass. Biljana Atanasova	Biological protection of plants – internal script	UGD-Stip	2010
2.	Prof. Dusan Spasov, Ass. Biljana Atanasova	Biological protection of plants – internal practicum	UGD-Stip	2010
3.				

22.2. **Additional literature**

Ordinal No.	Author	Title	Publisher	Year
1.	Проф. Д-р Ангел Харизанов, Доц. Д-р Тройка Барбикова, Вили Харизанова	Биологична борба срещу неприятелите по културните растения	"Агроинжене ринг" ЕООД. ИК „Агропрес". Софија	1996

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**LABORATORY PRACTICE 2**			
2.	**Course code**	**2ZF200612**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	"Goce Delcev"University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	Second / III	7.	Number of ECTS credits	8
8.	**Professor**	**Prof. Sasa Mitrev, PhD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** acquisition of knowledge and practice in the laboratory				
11.	**Content of the course programme:** **Content of the lectures:** 1. Introduction to the general requirements for laboratory work and application of safety measures in the laboratory work 2. Ways of applying apparatus in the laboratory 3. Recognition and terminology of symptoms and diseases 4. Preparation of media for isolation of bacteria and fungi 5. Tests to identification the type of bacteria 6. Tests to determine the type of fungus 7. PCR technique for the diagnosis of type 8. RFLP				

	technique for detection the gene type of pathogen 9. Microscopy technique using a light microscope and binocular 10. Technique using electron microscopy 11. Microscopic study of diseased material 12. Viruses - mechanical transmission of test plants **Content of exercises:** 1. Introduction to the general requirements for laboratory work and application of safety measures prescribed by the laboratory - rules of good laboratory practice 2. Ways of applying apparatus in the laboratory - a laboratory introduction to the work of each appliance 3. Recognition and terminology of symptoms and diseases - laboratory exercise on herbal plant material 4. Preparation of substrates for isolation of bacteria and fungi 5. Tests for identification and determination the type of bacteria 6. Tests to determine the type of fungus 7. PCR diagnostic technique 8. RFLP typing technique 9. Technique using a light microscope and binocular 10. Technique using electron microscopy 11. Microscopic study of diseased material 12. Viruses - mechanical transmission using test plants - video presentation				
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, making independent paper work, home teaching, consultancy.				
13.	**Total amount of available time**		216 hours		
14.	**Distribution of the available time**		3+2+2		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2	
16.	**Other forms of activities**	16.1.	Team projects		
		16.2.	Individual projects	2	
		16.3.	Individual study		
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)		30	
	17.2.	Project activities (oral and written presentation)		50	
	17.3.	Other forms of studying activities		20	
18.	**Criteria for assessment (points / grade)**		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities and attending to lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		
22.	**Literature**				

	Compulsory literature				
22.1.	Ordinal No.	Author	Title	Publisher	Year
	1.	Schaad N.W. Jones B.J. Chun W.	Laboratory guide for identification of plant pathogenic bacteria		2001
	2.	Baucloin A.B.A.M., Hooper G.R.	Laboratory exercise in Plant Pathology: An Instruction Kit		1988

			Mathre D.E. Carroll R.B.			
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.				

Appendix No.3	**Syllabus for the first, second and third cycle of study**					
1.	**Course title**	**MOLECULAR BIOLOGY**				
2.	**Course code**	**2ZF200712**				
3.	**Study programme**	**Phytomedicine**				
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection,				
5.	**Level (first, second, third cycle)**	Second cycle				
6.	**Academic year / semester**	Second / III	7.	Number of ECTS credits	8	
8.	**Professor**	**Prof. Liljana Koleva-Gudeva, PhD**				
9.	**Preconditions for course enrollment**	No				
10.	**Goals of the course programme:** Students are introduced with the course programme aims to introduce the students to the molecular analysis of mainly the three main types of bio macromolecules: DNA, RNA and proteins.					
11.	**Content of the course programme:** **Content of the lectures:** 1. Introduction, role, significance and objectives of molecular biology. 2. DNA methods. Isolation of genomic DNA. 3. Electrophoreses of DNA. 4. Hybridization of DNA. 5 Polymerase chain reaction - PCR. 6 Sequencing of DNA. 7 RNA methods. Isolation of total cellular RNA. 8 Reversible - Transcriptase polymerase chain reaction - RT-PCR. 9. Protein method. 10 Review methods of protein. 11. Electrophoreses of protein. 12 Fundamentals of bioinformatics. **Content of exercises (practical and laboratory):** 1. Isolation of genomic DNA from plant material. 2 Principles of amplification DNA. 3 Polymerase chain reaction - PCR. 4 Isolation of total cellular RNA from plant material. 5 Sequencing of DNA - Coding and non-coding DNA sequences – concept and diferendes. 6 Preparation of plant material for electrophoresis of proteins. 7 Electrophoresis of proteins. 8 Bioinformatics analysis in molecular biology. 9 Using online databases. 10 www.ncbi.nlm.nih.gov - search for nucleotide sequences. 11 www.ncbi.nlm.nih.gov - phylogenetic analyzes. 12 The significance of in vitro methods for molecular biology					
12.	**Methods of study:** Lectures, Theoretical exercises, Laboratory exercises, E-learning, individual and team projects, consultations for the final exam, Final exam.					
13.	**Total amount of available time**	216 hours				
14.	**Distribution of the available time**	3 + 2 + 2				
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	3		
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	2		
16.	**Other forms of activities**	16.1.	Team projects			
		16.2.	Individual projects	3		
		16.3.	Individual study			

17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)			30
	17.2.	Project activities (oral and written presentation)			50
	17.3.	Other forms of studying activities			20
18.	**Criteria for assessment (points / grade)**		to 50 points		5 (five) (F)
			from 51 to 60 points		6 (six) (E)
			from 61 to 70 points		7 (seven) (D)
			from 71 to 80 points		8 (eight) (C)
			from 81 to 90 points		9 (nine) (B)
			from 91 to 100 points		10 (ten) (A)
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities and attending to lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		
22.	**Literature**				
	22.1.	**Compulsory literature**			
		Ordinal No.	Author	Title	Publisher	Year
		1.	Saso Panov	Basic principles in molecular biology	UKIM, PMF, Skopje	2010
		2.	Liljana Koleva Gudeva	Basic principles in molecular biology - Unpublished lectures, ppt presentation,	UGD, Stip	2010
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Bruss Alberst, at all.	Molecular Biology of the cell	Garland Science, NY USA	2002

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**GENERAL PHYTOPATHOLOGY**			
2.	**Course code**	**2ZF200812**			
3.	**Study programme:**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	Department for plant and environmental protection Faculty of Agriculture University “Goce Delcev”- Stip.			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year/ first semester	7.	**Number of ECTS credits**	4
8.	**Instructor**	**Prof. Ilija Karov, PhD**			
9.	**Preconditions for course enrollment**				
10.	**Goals of the course programme**: Introducing students with the nature of the plant pathogens, symptoms and pathogenesis.				
11.	**Content of the course programme**: **Content of the lectures:**				

	1. Concept and development of phytopathology; economic importance of plant diseases, 2. Plant diseases and their causes: Parasitic diseases, fungal pathogens 3. Procariots as disease causers in plants: bacteria and molicutes 4. Phyto pathogen actinomycetes: rickettsia, molikutes, fitoplazmas spiroplazmas 5. Phytopathogenic viruses 6. Parasitic flowering plants 7. Symptomatology 8. Parasites and parasitism in plant life, 9. Pathological changes in sick plant 10. Pathogenesis 11. Changes in the intensity of the disease 12. Plant resistance to pathogens; **Content of the exercies:** 1. Description of symptoms caused by pathogen microorganisms 2. Isolation of fungal pathogens 3. Determination of pathogenicity of fungi 4. Identification of fungi based on its morphological characteristics; 5. Bacteria isolation 6. Determination of pathogenicity of bacteria; 7.Identification of the type of bacteria based on their biochemical characteristics; 8. Breeding characteristics of phytopathogen viruses 9. Determination of the virus type using ELISA test, 10. Modern methods of identification: Polimerase chain reaction; 11. Methods for evaluating the intensity of the disease 12. Genetic basis of host - parasite interactions;				
12.	**Methods of study**: Lectures, theoretical and practice exercises, consultations; individual work; home learning; preparatory classes for exams and mid-term tests: consultation;				
13.	**Total amount of available time**		120 hours		
14.	**Distribution of the available time**		2+1+1		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1	
16.	**Other forms of activities**	16.1.	Team projects	-	
		16.2.	Individual projects	-	
		16.3.	Individual study	1	
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)	50		
	17.2.	Project activities (oral and written presentation)	30		
	17.3.	Other forms of studying activities	20		
18.	**Criteria for assessment (points / grade)**		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**		60% of term activities		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		
22.	**Literature**				
	22.1.	**Compulsory literature**			
		Ordinal No.	Author	Title	Publisher	Year

		1.	Prof. d-r. Filip Pejcinovski and Prof. d-r. Sasa Mitrev	Agriculture Phytopathology (basic part)	UGD-Stip	2007
		2.	George N. Agrios	Plant pathology	Academic Press, New York, USA	2005
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Babovic M.	Osnovi patologije biljaka	Poljoprivredni fakultet, Univerzitet uBeogradu	2003
		2.	Lucas John Alexander	Plant pathology and plant pathogens	Oxford; Malden, Mass. Blackwell Science	1998

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**GENERAL ENTOMOLGY**			
2.	**Course code**	**2ZF200912**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First / first 2012/13	7.	Number of ECTS credits	4
8.	**Professor**	**Prof. Dusan Spasov, PHD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** Objective of the course is to introduce the students to the morphology and anatomy of the body of insects, with characteristics of higher taxa (Ordinals and families) with the ways of communication between insects and between insects and the environment, adaptations of various environmental factors, behaviour, reproduction and development of insects, basic measures to combat harmful insect species.				
11.	**Content of the course programme:** **Content of the lectures:** 1. Introduction, Origin of insects; Meaning of insects; Systematic position of insects. 2. External anatomy of insects; Construction of head and chest. 3. Construction of the abdomen, skin beetles. 4. Internal anatomy and physiology of insects, muscles and locomotion. 5. Digestive and excretory systems. 6. Circulatory and tracheal system. 7. Nervous and endocrine system. 8. Sentient organs. 9. Organs of reproduction, ways of breeding insects. 10. Development of insects; polymorphism. 11. Behavior of insects. 12. Ecology of insects. **Content of exercises:** 1. General structure of insects: construction head. 2. Antennae and mouth parts. 3. Construction of the thorax: legs and wings. 4. Construction of the abdomen and abdominal accessories. 5. Skin in insects. 6. Internal structure of insects: digestive and excretory sistem.7. Circulatory and tracheal system. 8. Structure of the nervous system and Sentient organs.9. Endocrine system. 10. Construction of the reproductive organs of the insects. 11. Types of larvae and pupas. 12. Techniques of collecting and conservation of insects.				

12.	**Methods of study:** Lectures, theoretic and field exercises, e-learning, individual and team projects, consultations.			
13.	**Total amount of available time**		120 hours	
14.	**Distribution of the available time**		2+1+1	
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1
16.	**Other forms of activities**	16.1.	Team projects	/
		16.2.	Individual projects	1
		16.3.	Individual study	/

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5(five) (F)
		from 51 to 60 points	6(six) (E)
		from 61 to 70 points	7(seven) (D)
		from 71 to 80 points	8(eight) (C)
		from 81 to 90 points	9(nine) (B)
		from 91 to 100 points	10(ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation	

22. **Literature**

22.1. **Compulsory literature**

Ordinal No.	Author	Title	Publisher	Year
1.	Prof. Dusan Spasov, Ass. Biljana Atanasova	General Entomology – peer reviewed script	UGD-Stip	2012
2.	Prof. Dusan Spasov, Ass. Biljana Atanasova	General Entomology – internal practicum	UGD-Stip	2010
3.				

22.2. **Additional literature**

Ordinal No.	Author	Title	Publisher	Year
1.	Танасијевић Н. и Симова-Тошић Душка	Општа ентомологија	Пољопривредни факултет, Земун	1987
2.	Gullan, P.J., Cranston, P.S	The insects: An outline of Entomology	Blackwell Publishing Ltd	2005

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**GENERAL HERBOLOGY**			
2.	**Course code**	**2ZF201012**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First / first 2012/13	7.	Number of ECTS credits	4
8.	**Professor**	**Prof. Dragica Spasova**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** Objective of the course is to introduce students to the properties of herbicides, the shape of their production, how determining the properties of herbicides, adoption and movement of herbicides, metabolism and mechanism of action. With the knowledge of the mechanism of action of herbicides creates the basis for the destruction of weeds, which in exceptional circumstances will be the best solution.				
11.	**Content of the course programme:** **Content of the lectures:** 1. Historical development of the application of herbicides. Place and importance of the application of herbicides, 2. Classification of herbicides: chemical 3. Classification of herbicides based on the scope of the weeds 4. Classification of herbicides based on the mode of action on the plant 5. Classification of herbicides based on time and way of use 6. Classification of herbicides according to the scope of the weeds 7. Forms of production of herbicides, 8. General properties of herbicides: adoption and movement of herbicides in plant 9. Mechanism action of herbicides. Selective properties of herbicides, 10. Persistence (longevity) of herbicides in soil. Movement of herbicides in soil. Toxicological properties of herbicides. 11. Technique of application of herbicides, 12. Methods for evaluating the effectiveness of herbicides. Evaluating the phytotoxic action of herbicides. **Content of exercises:** 1. Testing of new compounds as herbicides, 2. Biological testing of herbicides, 3. Methodological issues in assessing the toxicity of herbicides 4. Index toxicity, LD50; 5. Machinery and apparatus for applying herbicides 6. Application of herbicides by aircraft. 7. Determination of consumption water in bottles, 8. Calculating the amount of herbicide to be put the spray nozzle 9. Determination of the required amount of herbicide for 1 hectare; 10. Determining the economic feasibility of the use of herbicides, 11. Evaluating the effectiveness of herbicides on the method of squares 12. General principles of rendering first aid in case of toxicity with herbicides.				
12.	**Methods of study:** Lectures, theoretic and field exercises, e-learning, individual and team projects, consultations.				
13.	**Total amount of available time**		120 hours		
14.	**Distribution of the available time**		2+1+1		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1	
16.	**Other forms of activities**	16.1.	Team projects	0,5	
		16.2.	Individual projects	0,5	

		16.3.	Individual study	/

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5(five) (F)
		from 51 to 60 points	6(six) (E)
		from 61 to 70 points	7(seven) (D)
		from 71 to 80 points	8(eight) (C)
		from 81 to 90 points	9(nine) (B)
		from 91 to 100 points	10(ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation; Periodical tests for students; survey.	

22. **Literature**

Compulsory literature

	Ordinal No.	Author	Title	Publisher	Year
22.1.	1.	Vaskrsija Janjić	Herbicidi	Naucna knjiga, Beograd	1985
	2.	Kojić, M. Janji, V., Stepić, R.	Korovi I njihovo sizbijanje	IŠPJŽ "BIROGRAFIKA ", Subotica	1996
	3.	Костов, Т.	Хербологија	УКИМ, факултет за земјоделски науки и храна. Скопје	2006

Additional literature

	Ordinal No.	Author	Title	Publisher	Year
22.2.	1.	Thomas J. M. Stephen C. Weller. Floyd M. Ashton	Weed science. Principles and practices	Printed in the United States of America	2002

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**MYCOLOGY**			
2.	**Course code**	**2ZF201112**			
3.	**Study programme:**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	Department for plant and environmental protection Faculty of Agriculture University “Goce Delcev”- Stip.			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year/ first semester	7.	**Number of ECTS credits**	4
8.	**Instructor**	**Prof. Ilija Karov, PhD**			

9.	**Preconditions for course enrollment**				
10.	**Goals of the course programme**: Students are introduced with the nature of fungi, their distribution and classification. Introduction to the biology and symptoms caused by major fungi, causers of plants diseases and implementation of measurements for protection against them.				
11.	**Content of the course programme**: **Content of the lectures:** 1. The place of fungi in the living world; 2.Morphology; 3. Reproduction; 4. Nutrition; 5. Environmental factors for development of fungi; 6. Classification and nomenclature; 7. Phylum I: Muxomycota, class: Acrasiomycetes, Myxomycetes, Plasmodiophoromycetes; 8. Phylum II: Eumycota; Subphylum I: Mastigomycotina, classes: Chytridiomycetes, Hyphochytridiomycetes, Oomycetes; 9. Subphylum II: Zygomycotina, classes: Zigomycetes, Trichomycetes; 10. Subphylum III: Ascomycotina, classes: Hemyascomycetes, Plectomycetes, Discomycetes; 11. Subphylum V: Deuteromycotina, classes: Blastomycetes, Hyphomycetes, Coelomycetes; 12. Measurements for protection. **Content of exercises:** 1. Morphological characteristics of the lower fungi; 2. Morphological characteristics of the higher fungi; 3. Bodies for wintering; 4. Mechanism of infection 5. Symptomatology of plant pathogen fungi; 6. Mediums for isolation of fungi and preparation of standard substrate, PDA; 7. Isolation of fungi, in vitro; 8. Description of the morphological characteristics of the isolated culture; 9. Microscopic identification of the species and variety; 10. Mycoses at the vegetable cultures; 11. Mycoses at the field crop cultures; 12. Mycoses at fruit trees and vine culture.				
12.	**Methods of study**: Lectures, theoretical and practice exercises, consultations; individual work; home learning; preparatory classes for exams and mid-term tests: consultation;				
13.	**Total amount of available time**		120 hours		
14.	**Distribution of the available time**		2+1+1		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1	
16.	**Other forms of activities**	16.1.	Team projects	-	
		16.2.	Individual projects	1	
		16.3.	Individual study	-	
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)		30	
	17.2.	Project activities (oral and written presentation)		50	
	17.3.	Other forms of studying activities		20	
18.	**Criteria for assessment (points / grade)**		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**		60% of term activities or minimum		

20.	**Language in which classes are conducted**		Macedonian			
21.	**Method of monitoring the quality of instruction**		Self-evaluation			
22.	**Literature**					
		Compulsory literature				
	22.1.	Ordinal No.	Author	Title	Publisher	Year
		1.	Prof. d-r. Filip Pejcinovski and Prof. d-r. Sasa Mitrev	Agriculture Phytopathology (basic part)	UGD-Stip	2007
		2.	Prof. d-r. Filip Pejcinovski and Prof. d-r. Sasa Mitrev	Agriculture Phytopathology (special part)	UGD-Stip	2007
		3.	George N. Agrios	Plant pathology	Academic Press, New York, USA	2005
		Additional literature				
	22.2.	Ordinal No.	Author	Title	Publisher	Year
		1.	Mirko S. Ivanovic, Dragica M. Ivanovic	Mykosis and Pseudomycosis of plants	P.P.De-eM-Ve, Paris Komun 37	2001
			Проф. д-р. Мунтанола Цвткович	Општа микологија	Научна книга Белград	1990

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**VIROLOGY**			
2.	**Course code**	**2ZF201212**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	"Goce Delcev"University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First / II	7.	Number of ECTS credits	4
8.	**Professor**	**Prof, Sasa Mitrev, PhD**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** **Content of the lectures:** 1. Concept and development of plant diseases 2. Economic importance of plant diseases 3. Phytopathogenic viruses 4. Symptoms of plant diseases 5. Important plant diseases caused by phytopathogenic viruses 6. Significant virus diseases on vegetables - bronze necrosis virus in tomato, cucumber mosaic virus 7. Significant viral diseases in vegetables - tobacco mosaic virus on pepper, potato mosaic virus 8. Significant viroses in cereals - cucumber mosaic virus on barley 9. Significant				

	grapevine virus diseases – leafroll virus, fanleaf virus 10. More important virus diseases in fruit crops 11. Measures for plant protection against phytopathogenic viruses 12. Biological control **Content of exercises:** 1. Concept and development of plant diseases 2. Economic importance of plant diseases 3. Phytopathogenic viruses 4. Symptoms of plant diseases 5. Important plant diseases caused by phytopathogenic viruses 6. Significant virus diseases on vegetables - bronze necrosis virus in tomato, cucumber mosaic virus 7. Significant viral diseases in vegetables - tobacco mosaic virus on pepper, potato mosaic virus 8. Significant viroses in cereals - cucumber mosaic virus on barley 9. Significant grapevine virus diseases – leafroll virus, fanleaf virus 10. More important virus diseases in fruit crops 11. Measures for plant protection against phytopathogenic viruses 12. Biological suppression				
11.	**Content of the course programme:** Study of the basic characteristics of viruses as causal agent of plant diseases, plants with significant symptoms form viruses at the territory of Macedonia and applying appropriate measures to protect				
12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, making independent paper work, home teaching, consultancy.				
13.	**Total amount of available time**		120 hours		
14.	**Distribution of the available time**		2+1+1		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2	
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1	
16.	**Other forms of activities**	16.1.	Team projects		
		16.2.	Individual projects	1	
		16.3.	Individual study		
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)		30	
	17.2.	Project activities (oral and written presentation)		50	
	17.3.	Other forms of studying activities		20	
18.	**Criteria for assessment (points / grade)**		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91 to 100 points	10 (ten) (A)	
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities and attending to lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		

22.	**Literature**					
	22.1.	**Compulsory literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – first part	Goce Delcev University, Stip	2007
		2.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – special part	Goce Delcev University, Stip	2009

		3.	Mitrev Sasa, Kostadinovska Emilija	Book for phytopathology exercise	Goce Delcev University, Stip	2010
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Rogert Hull	Comparative Plant Virology	Elsevier Academic Press	2009
		2.	Rogert Hull	Plant virology	Academic press	2002
		3.	Dragoljub Sutic	Plant virology	Institute of Plant and Environmental protection, Beograd	1995

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**BACTERIOLOGY**			
2.	**Course code**	**2ZF201312**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	"Goce Delcev"University - Stip, Faculty of Agriculture, Stip, Department for plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First year/ II semester	7.	Number of ECTS credits	4
8.	**Professor**	**Prof d-r Sasa Mitrev**			
9.	**Preconditions for course enrollment**	No			
10.	**Goals of the course programme:** Study of the basic features of bacterial causal agents of plant diseases, most spreader and visual symptoms of bacterial diseases in Macedonia and applying appropriate plant protection measurement				
11.	**Content of the course programme:** **Content of the lectures:** 1. Concept and development of plant diseases 2. Economic importance of plant diseases 3. Properties of phytopathogenic bacteria 4. Symptoms of plant diseases 5. Important plant diseases caused by phytopathogenic bacteria 6. Important bacterial diseases in vegetable crops - bacterial wet rot in plants, bacterial spots on pepper 7. Important bacterial diseases in vegetable crops - bacterial cancer and tomato pith necrosis. 8. Important bacterial diseases in vegetable crops - bacterial brown rot of potato 9. Important bacterial diseases in grapevine 10. Important bacterial diseases in fruit crops 11. Plant protection measurements 12. Biological control **Content of exercises:** 1. Concept and development of plant diseases - conditions for disease 2. Biotic and abiotic factors - video presentations 3. Methods of bacterial isolation of nutrition agar - laboratory exercise 4. Symptoms of plant diseases - symptoms - laboratory exercises – herbal plant material 5. Important plant diseases caused by bacteria - list of diseases with their pathogenic causes 6. Important bacterial diseases in vegetable crops - bacterial wet rot in plants, bacterial spots on pepper 7. Important bacterial diseases in vegetable crops - bacterial cancer and tomato pith necrosis. 8. Important bacterial diseases in vegetable crops - bacterial brown rot of potato 9. Important bacterial diseases in grapevine 10. Important bacterial diseases in fruit crops 11. Plant protection measurements – video presentation 12. Biological control – video presentation				

12.	**Methods of study:** lectures, theoretical and practical exercises, consultations, making independent paper work, home teaching, consultancy.			
13.	**Total amount of available time**		120 hours	
14.	**Distribution of the available time**		2+1+1	
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1
16.	**Other forms of activities**	16.1.	Team projects	
		16.2.	Individual projects	1
		16.3.	Individual study	

17.	**Forms of assessment**		
	17.1.	Exams (midterm exams, exam, electronic testing)	30
	17.2.	Project activities (oral and written presentation)	50
	17.3.	Other forms of studying activities	20

18.	**Criteria for assessment (points / grade)**	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	**Condition for getting a signature and taking the final exam**	60% of term activities, project activities and attending to lectures and discussions	
20.	**Language in which classes are conducted**	Macedonian	
21.	**Method of monitoring the quality of instruction**	Self-evaluation	

22. **Literature**

22.1. **Compulsory literature**

Ordinal No.	Author	Title	Publisher	Year
1.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – first part	Goce Delcev University, Stip	2007
2.	Pejcinovski Filip, Mitrev Sasa	Plant pathology – special part	Goce Delcev University, Stip	2009
3.	Mitrev Sasa, Kostadinovska Emilija	Book for phytopathology exercise	Goce Delcev University, Stip	2010

22.2. **Additional literature**

Ordinal No.	Author	Title	Publisher	Year
1.	P. Vidhyasekaran, PhD, FNA	Concise Encyclopedia of Plant Pathology	Food Production Press	2004
2.	Momcilo Arsenijevic	Plant bacterioses	S Print Novi Sad	1997
3.	Momcilo Arsenijevic	Phytopathogenic bacteria	Scientific book Beograd	1992

Appendix No.3	**Syllabus for the first, second and third cycle of study**					
1.	**Course title**	**SPECIAL ENTOMOLGY**				
2.	**Course code**	**2ZF201412**				
3.	**Study programme**	**Phytomedicine**				
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection				
5.	**Level (first, second, third cycle)**	Second cycle				
6.	**Academic year / semester**	First / second 2012/13	7.	Number of ECTS credits	4	
8.	**Professor**	**Prof. Dusan Spasov, PhD**				
9.	**Preconditions for course enrollment**	No				
10.	**Goals of the course programme:** The course objective is to familiarize students with basic taxonomic characteristics of insects for their classification in taxonomic categories in Ordinal, family, genus, learning important harmful and beneficial insects, and other pests of agricultural crops.					
11.	**Content of the course programme:** **Content of the lectures:** 1. Classification of insects; Subclass Apterygota. 2. Class Pterygota: Ordinal Ephemeroptera, Ordinal Odonata. 3. Ordinal Orthoptera, Ordinal Phasmida. 4. Ordinal Dictyoptera, Ordinal Isoptera, Ordinal Dermaptera. 5. Ordinal Anoplura, 6. Ordinal Thysanoptera. 7. Ordinal Hemiptera. 8. Ordinal Homoptera, Ordinal Neuroptera. 9. Ordinal Coleoptera. 10. Ordinal Lepidoptera. 11. Ordinal Diptera.12. Ordinal Hymenoptera, Ordinal Siphanoptera. Exercises: 1. The most important taxonomic characteristics of insects for classifying in specific Ordinals. Morphological features of insects for classifying in the subclass Apterygota 3. Morphological features of insects for classifying in Ordinal Orthoptera, 4. Morphological features of insects for classifying in Ordinal Dyctioptera and Isoptera 5. Morphological features of insects for classifying in Ordinal Dermaptera. 6. Morphological features of insects classifying in Ordinal Thysanoptera. 7. Morphological features of insects for classifying in Ordinal Heteroptera. 8. Morphological features of insects for classifying in Ordinal Homoptera and Neuroptera. 9. Morphological features of insects for classifying in Ordinal Coleoptera. 10. Morphological features of insects for classifying in Ordinal in Ordinal Lepidoptera. 11. Morphological features of insects classifying in Ordinal Diptera 12. Morphological features of insects for classifying in Ordinal Hymenoptera.					
12.	**Methods of study:** Lectures, theoretic and field exercises, e-learning, individual and team projects, consultations.					
13.	**Total amount of available time**	120 hours				
14.	**Distribution of the available time**	2+1+1				
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training	2		
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork	1		
16.	**Other forms of activities**	16.1.	Team projects	/		
		16.2.	Individual projects	1		
		16.3.	Individual study	/		

17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)			30
	17.2.	Project activities (oral and written presentation)			50
	17.3.	Other forms of studying activities			20
18.	**Criteria for assessment (points / grade)**		to 50 points		5(five) (F)
			from 51 to 60 points		6(six) (E)
			from 61 to 70 points		7(seven) (D)
			from 71 to 80 points		8(eight) (C)
			from 81 to 90 points		9(nine) (B)
			from 91 to 100 points		10(ten) (A)
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities and attending to lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		
21.	**Method of monitoring the quality of instruction**		Self-evaluation		
22.	**Literature**				
	22.1.	**Compulsory literature**			
		Ordinal No.	Author	Title	Publisher	Year
		1.	Prof. Dusan Spasov, Ass. Biljana Atanasova	Special Entomology – internal script	UGD-Stip	2010
		2.	Prof. Dusan Spasov, Ass. Biljana Atanasova	General Entomology – internal practicum	UGD-Stip	2010
		3.				
	22.2.	**Additional literature**				
		Ordinal No.	Author	Title	Publisher	Year
		1.	Танасијевић Н. и Симова-Тошић Душка	Посебна ентомологија	Пољопривредни факултет, Земун	1985
		2.	Chinery M.	Collins field guide Insects of Britain and Northern Europe	Harper Collins Publishers	1993

Appendix No.3	**Syllabus for the first, second and third cycle of study**				
1.	**Course title**	**SPECIAL HERBOLOGY**			
2.	**Course code**	**2ZF201512**			
3.	**Study programme**	**Phytomedicine**			
4.	**Organizer of the study programme (faculty, institute, group)**	University “Goce Delcev”- Stip, Faculty of Agriculture, Stip, Plant and environmental protection			
5.	**Level (first, second, third cycle)**	Second cycle			
6.	**Academic year / semester**	First / second 2012/13	7.	Number of ECTS credits	4
8.	**Professor**	**Prof. Dragica Spasova, PhD**			

9.	**Preconditions for course enrollment**		No		
10.	**Goals of the course programme:** The course aims to provide knowledge of the changes occurring in weed communities, proposing measures to prevent the occurrence and spread of weed vegetation in certain cultures.				
11.	**Content of the course programme:** **Content of the lectures:** 1. Destruction of weeds: indirect (preventive) measures and direct measures 2. Chemical measures for the destruction of weeds 3. Destruction of weeds in crops with dense structure 4. Destruction of weeds in forage crops; 5. Destruction of weeds in industrial crops 6. Destruction of weeds in vegetables 7. Destruction of weeds in beds to produce seedlings of tomato, pepper, tomato, 8. Destruction of weeds in beds to produce seedlings of onions and leeks 9. Destruction of weeds in beds to produce seedlings of cabbage and cauliflower, 10. Destroying narrow leaf and broadleaf weeds in crops throughout the vegetation. 11. Destruction of weeds in vineyards and orchards: young plants (3 - 4) years 12. Destruction of weeds in vineyards and orchards: old plantations (aged 3-4 years). **Content of exercises:** 1. Introduction to the technique of performing experiments with field herbicides; 2. Introduction to the technique of performing laboratory experiments with herbicides. 3. Specifically to process harmful weeds in crops with dense structure 4. Specifically to process weeds in forage crops 5. Weeds in industrial cultures 6. Weed the garden: Fam. *Solanaceae*; 7. Weeds in vegetables: Fam *Cucurbitaceae*; 8. Weed the garden: Fam. *Brasicaceae*; 9. Weed the garden: Fam. *Apiaceae*; 10. Narrow leaf weeds in broadleaf crops. 11. Weeds in vineyards 12. Weed in orchards.				
12.	**Methods of study:** Lectures, theoretic and field exercises, e-learning, individual and team projects, consultations.				
13.	**Total amount of available time**		120 hours		
14.	**Distribution of the available time**		2+1+1		
15.	**Forms of teaching activities**	15.1.	Lectures - theoretical training		2
		15.2.	Exercises (laboratory, auditory), workshops, outreach and teamwork		1
16.	**Other forms of activities**	16.1.	Team projects		0,5
		16.2.	Individual projects		0,5
		16.3.	Individual study		/
17.	**Forms of assessment**				
	17.1.	Exams (midterm exams, exam, electronic testing)		30	
	17.2.	Project activities (oral and written presentation)		50	
	17.3.	Other forms of studying activities		20	
18.	**Criteria for assessment (points / grade)**		to 50 points		5(five) (F)
			from 51 to 60 points		6(six) (E)
			from 61 to 70 points		7(seven) (D)
			from 71 to 80 points		8(eight) (C)
			from 81 to 90 points		9(nine) (B)
			from 91 to 100 points		10(ten) (A)
19.	**Condition for getting a signature and taking the final exam**		60% of term activities, project activities and attending to lectures and discussions		
20.	**Language in which classes are conducted**		Macedonian		

21.	**Method of monitoring the quality of instruction**		Self-evaluation; Periodical tests for students; survey.		
22.	**Literature**				
		Compulsory literature			
	22.1.	Ordinal No.	Author	Title	Publisher	Year
		1.	Kojić, M. Šinžar, B.	Korovi	Naucna knjiga, Beograd	1985
		2.	Kojić, M. Janji, V., Stepić, R.	Korovi I njihovo sizbijanje	IŠPJŽ "BIROGRAFIKA ", Subotica	1996
		3.	Kovačevič, J.	Korovi u poljoprivredi	Nakladni zavod Znanje, Zagreb	1974
		4.	Костов, Т.	Хербологија	УКИМ, факултет за Земјоделски науки и храна, Скопје	2006
		Additional literature				
	22.2.	Ordinal No.	Author	Title	Publisher	Year
		1.	Thomas J. M. Stephen C. Weller. Floyd M. Ashton	Weed science. Principles and practices	Printed in the United States of America	2002