PLANT PROTECTION

Basic data of the subject	
Academic Unit:	Faculty of Life and Environmental Sciences
Course title:	Plant Protection
Study program:	Agribusiness
Level:	Bachelor Master (MSc)
Course status:	Elective (E)
Study year:	III year
Number of hours per week:	2 + 2
Credit value – ECTS:	6 ECTS
Time / location:	To be announced
Lecturer:	Prof. Assoc. Dr. Fadil Musa
Contact details:	Fadil.musa@uni-pr.edu; +383 44 213 795
Course description:	This course is designed to provide students with theoretical and practical knowledge of pests and diseases of agricultural crops. During this course, students will be introduced to insect morphology: head, antennae, oral apparatus, chest, arms, legs, abdomen, and appendages therein. Integument, Muscular system, body cavity, digestive system, respiratory system, circulatory system, nervous system, sensory organs (for sight, hearing, touch, smell, taste), reproductive organs. Insect breeding and development. Embryonic and post-embryonic development. Incomplete insects (Hemimetabola), Incomplete insects (Holometabola). Larva. Nymph. Imago. Dimorphism and polymorphism. Diapauza. The biological cycle of insects. Classification of insects. Getting to know representatives of groups (genders, families, orders). Wingless Insects-Apterygota (Protura, Diplura, Collembola, Thysanura). Winged insects - Pterygota (Orthoptera, Blatodea, Mantodea, Isoptera, Dermaptera, Thysanoptera, Heteroptera, Homoptera, Coleoptera, Lepidoptera, Diptera, and Hymenoptera). Ecological factors, their importance, and classification. Abiotic factors (temperature, humidity, light, air movements, soil). Biotic factors (food, bacteria, fungi, man, and predators). Arachnida (spiders). Myriapoda (centipedes). Gastropoda (snails). Nematodes (nematodes). Mammalia (mammals). Principles of phytopathology. fungi, bacteria and viruses as causes of diseases in crops. Propagation and development of plant pathogens. The stages of development of the disease. Impact of ecological factors on pathogenesis. Epiphytology and Pathophysiology. Effects of pathogens on physiological functions. Polyphagous pests and pathogens. Pests and diseases of crops and vegetables. Pests and diseases of agricultural products in the warehouse. Pests and diseases of trees and grape vines. Plant protection measures. Form of production and method of use of chemical preparations. Classification of chemicals for plant protection. Insecticides. Mites. Nematocides. Rodenticides. Limacidet. Care and protective measures at work.
Course objectives:	The purpose of the module is to provide theoretical, practical, and scientific knowledge on insects and pathogens affecting agricultural crops. To explain the taxonomy, morphology, and biology of insects. The main pests in different crops and the damage caused. Key measures for the management of biological harmful agents. Offering knowledge of Mycology. On the systematics and nomenclature of fungi. Important

	concepts were presented with examples of existing problems from major diseases. Multiplication of fungi. Fungi physiology and ecology. The main diseases of different crops grown in our country and the measures for their management.
Learning outcomes:	Upon completion of this course, the student will be able to: ▪ To know the basic elements regarding pests and pathogens causing diseases in crops. ▪ Understand the ways of occurrence, spread, and propagation of pests and pathogens causing diseases in crops. ▪ Understand the symptoms of pests and diseases as well as the ways of wintering pests and pathogens. ▪ Apply knowledge gained from the plant protection course to the practice.

Contribution on student load (must correspond with learning outcomes)			
Activity	**Hours**	**Days/week**	**Total**
Lectures	2	15	30
Exercise theoretical/laboratory	2	15	30
Practice work	1	3	3
Contact with lecturer/consultations	1	15	15
Field exercises	1	3	3
Mid-terms, seminars	2	2	4
Homework	1	13	13
Individual time spent studying (at the library or home)	2	15	30
Final preparation for the exam	2	8	16
Time spent in evaluation (tests, quiz, final exam)	2	2	4
Projects, presentations, etc.	2	1	2
Total			**150 hours (6 ECTS)**

Teaching methods:	This is a lecture-lab course in which topics are presented by the Professor and Practical parts, lab activities, and excursions are explained by the Professor and the Teaching Assistants. Generally, PowerPoint presentations are available in the course reserve collection database of the Faculty one day after each single lecture. Additional material will be provided by the Professor. Lecture attendance is strongly encouraged.

	Verification of knowledge will be performed after the completion of learning cycles. After completing the lectures there is a compulsory testing part via colloquium and oral final exam.
Evaluation methods:	Student evaluation is made by giving the percentages of participation of each evaluation during exercises in the final evaluation. First evaluation: 30 % Second evaluation: 25% Homework and other engagements 10% Regular attendance 5% Final exam 30% Total 100%
Literature	
Basic Literature:	1. Pireva, I. (1996): Entomologjia e Përgjithshme. Universiteti i Prishtinës. Fakulteti i Bujqësisë Prishtinë. 2. Susuri, L. & Myrta, A. (2012): Sëmundjet e pemëve frutore dhe të hardhisë së rrushit. Prishtinë. 3. Myrta, A. (2013): Bazat e Virusologjisë Bimore. ADDA Editore. Itali. 4. Susuri, L. (2004): Fitopatologjia. Prishtinë. 5. Alford, D. (1999): A Textbook of Agricultural Entomology. Ministry of Agriculture, Fisheries and Food, Cambridge, UK.
Additional Literature:	1. Capinera, L. (2001): Handbook of vegetable pest. Academic Pres. Harcourt Place, 32 Jamestown Road, London. UK. 2. Raspudić Emilija, Jurković Draženka, Vrandečić Karolina, Štefanić Edita, Šamota D., Baličević Renata, Rozman Vlatka, Liška Anita, Ranogajec Ljubica (2009)**:** Najznačajniji štetnici, bolesti i korovi u uzgoju povrća. Poljoprivredni Fakultet u Osijeku. Osijek. Croatia.

Designed study plan:		
Week	**Lectures**	**Exercises**
First week:	Basic features of insect construction. Insect Morphology.	Insect morphology (head, chest, abdomen, oral apparatus, antennae, legs).
Second week:	Anatomy and physiology of insects.	Insect anatomy (nervous system, circulatory system, respiratory system, digestive system).
Third week:	Insect biology and multiplication.	Insect biology (reproductive organs, ways of reproduction).
Fourth week:	Insect ecology. Population Level and Dynamics.	Embryonic development (embryogenesis), Post-embryonic development (larvae, nymphs, imago). Insect Metamorphosis

		(Heterometabola and Holometabola).
Fifth week:	Insect Systematics.	Insect Systematics.
Sixth week:	Pests of field crops and vegetables.	Insects Heterometabola (*Orthoptera*, *Heteroptera*, *Homoptera*, and *Thysanoptera*).
Seventh week:	Pests of fruit trees and grape vines.	Insect Holometabola (*Lepidoptera*, *Coleoptera*, *Hymenoptera* and *Diptera*)
Eighth week:	Background, Development, Concept, and Classification of Diseases in Crops.	Disease triangle, pathogenesis, and stages of disease development.
Ninth week:	Taxonomy of Fungi, Bacteria and Phytopathogenic Viruses.	Fungi, their structure, construction, and propagation.
Tenth week:	Biological features of fungi, bacteria, and viruses.	Fungal Systematics (Oomycetes, Zygomycetes, Ascomycetes, Basidiomycetes, and Deutoromycetes).
Eleventh week:	Stages of disease development and the influence of ecological factors on pathogenesis.	Bacteria, their structure, construction, propagation, and classification.
Twelfth week:	Diseases caused by fungi in field crops and vegetables.	Viruses, their structure, construction, and propagation.
Thirteenth week:	Diseases caused by fungi in fruit crops and grape vines.	Preparation of nutritional bases for isolation of pathogens (fungi and bacteria) and their identification.
Fourteenth week:	Diseases caused by bacteria, viruses, and other pathogens in crops. Measures to combat pests and pathogens of crops.	Measures to combat pests and pathogens affecting crops.
Fifteenth week:	Evaluation in written form	Written colloquium (part of practical work).
Academic policies and rules of conduct:		
- Regular attendance in lectures and exercises - politeness' rules like: calmness and listening during the lectures - Presence in class on time, - Mobile phone switch off.		