NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department Entomology, integrated protection and quarantine of plants

"APPROVED"

by the Dean of the Faculty Plant protection, Biotechnology and Ecology _____ (Yulia KOLOMIYETC) Protocol № 10 dated "21" 05 2025

"APPROVED"

at the meeting of the department Entomology, integrated protection and quarantine of plants Protocol №11_ dated "14"_05_2025 Head of Department _____ (Mykola DOLYA)

"REVIEWED "

Guarantor of the AP <u>Plant protection and quarantine</u> (Myroslav PIKOVSKYI)

PROGRAM OF THE COURSE

GENERAL ENTOMOLOGY

 Field of knowledge <u>H</u> "Agriculture, forestry, fisheries and veterinary medicine"

 Specialty <u>H1</u> "Agronomy"

 Academic programme <u>Plant protection and Guarantine</u>"

 Faculty <u>Plant protection, Biotechnology and Ecology</u>

 Author: <u>PhD, Associated Professor Liudmyla Kava</u>

Description of the discipline General entomology

The cource is desighned to teach students to identify insect, study of insects, their external and internal biulding. After this course student will be able to explain the importance of insects and to use standart keys to idetifying insects to family and subfamily. Basic concepts of entomology such as morphology, taxonomy and systematics, developmental biology, and ecology provide important background information for Agricultural Entomology

Field of knowledge, specializatio	n, educational program, educational degree
Academic degree	Bachelor's
Specialty	H1 "Agronomy"
Academic programme	Plant protection and Guarantine
Character	istics of the discipline
Туре	Compulsory
Total number of hours	240
Number of ECTS credits	8
Number of content modules	4
Course project (work) (if applicable)	30
Form of assessment	Exam

Indicators of the course for full-time and part-time forms of study

	Full-time form of	Part-time form of study
	study	
Course (year of study)	3	3
Semester	5,6	6
Lecture classes	60	8
Practical, seminar classes		
Laboratory classes	90	12
Self-study	90	94
Individual assignments		
Number of weekly classroom hours	4	
for the full-time form of study		

1. Aim, competences and expected learning outcomes of the discipline

Aim:

- Explain the importance of insects as members of ecosystems.
- Describe the basic anatomy, morphology, taxonomy, development, life histories and key characteristics of different insect groups.
- Identify common orders and families of insects.
- Demonstrate the ability to properly collect and curate insects

Acquisition of competencies:

Integrated competency (IC): The ability to solve complex specialized tasks and practical problems of professional activity in plant protection and quarantine or in the learning process, characterized by complexity and uncertainty of conditions, using theories and methods of biology and agricultural sciences.

General competencies (GC):

GC 1 The ability to think abstractly, analyze, and synthesize.

GC 2 Ability to apply knowledge in practical situations.

GC 8 Ability to generate new ideas (creativity).

GC 11. Ability to work in an international context considering

international and regional standards on phytosanitary measures, international and regional organizations of plant protection and quarantine.

Professional (special) competencies (PC)

SC 1 Ability to do phytosanitary diagnosis of plant diseases, insects, mites, nematodes, rodents and weeds according to modern principles and methods.

SC 4 Ability to communicate in the state language both orally and in writing.

SC 5 Ability to communicate in a foreign language, ability to work in a foreign language environment.

SC 7 Ability to learn and master modern knowledge and research

SC 8 The ability to generate new ideas (creativity).

SC 9 Ability to make informed decisions.

SC 11 Ability to work in an international context, taking into account international and regional standards on phytosanitary measures, international and regional plant protection and quarantine organizations

Expected Learning Outcomes (ELO):.

ELO 8 Be able to coordinate, integrate and improve organization of production processes during protection measures plants;

ELO 9 Effectively plan time to receive forecasts results of plant protection and quarantine activities

ELO 16 Know the main historical stages of development of the subject area.

2. Programme and structure of the discipline for:

Number of hours													
					Full-time form					tim	e forr	n	
2	we	tot		i	nclud	ing		total		i	ncludi	ing	
	eks	al	1	р	lab	in	sel		1	р	lab	in	sel
						d	f					d	f
1	2	3	4	5	6	7	8	9	10	1 1	12	13	14
Module 1. Fo	ormati	ion of	ento	mo	logy a	is a s	cience	e. Extern	al ana	ato	my		
Topic 1. Introduction.	1		2		2								2
Subject main objectives													
of the subject "General													
entomology"													
Topic 2. Importance of	2		2		2		2						2
Insects. Evolution and													
Diversity													
Topic 3. External	3		2		2		2		0,5		0,5		2
anatomy (exosceleton).													
The Integument and													
Cuticular Structures													
Topic 4. The Head.	4		2		2		2		0,5		0,5		2
Antenae.	-				•		-		0 7		0.7		-
Topic 5. Mouthpart and	5		2		2		2		0,5		0,5		2
modification.	6				4		2		0.5		0.5		4
Topic 6. Torax (legs,	6		2		4		2		0,5		0,5		4
wings and locomotion)	7				4		2				0.5		4
Topic 7. Abdomen	/		2		4		2				0,5		4
Topic 8. Egg Structure	8		2		4		2				0,5		4
The types of insect's													
eggs	0		2		4		2						4
incost's large	9				4		2						4
Topic 10. The types of	10		2		4		2						4
insect's pupe	10				4		2						4
Total for content module	70		20		30		20		2		3		30
	70		20		50		20		2		5		30
M	odule	2 In	terns	al A	nator	nv ar	nd Ph	vsiology					
Topic 1 Respiratory	11	2. 11	2		2	iiy ui	2	JSIOIOSJ	0.5		05		2
System			_		-		_		0,0		0,0		-
Topic 2 Circulatory	12		2		2		2		0.5		0.5		2
System									- ,-		- ,-		
Topic 3. Digestive &	13		2		2		2		0,5		0,5		2
Excretory Systems											· ·		
Topic 4. <u>Reproductive</u>	14		2		2		2		0,5		0,5		2
System													
Topic 5. Nervous System	15		2		4		2				0,5		4
Topic 6. Endocrine	16		2		2		2				0,5		4
System and hormone													
Topic 7. Muscular	17		2		2		2						4
system of insects and													
locomotion													

Total for content module 2		44	14		16		14		2		3	20
Module 3. Gr	owth	and I	Devel	opn	nent	and]	Behav	vior. Inse	ects eq	colo	gy	
Topic 1. Embryogenesis	18		2		2		2		0,5		0,5	2
Topic 2. Morphogenesis	19		2		2		2		0,5		0,5	2
Topic 3. Survival	20		2		4		2		0,5		0,5	4
Strategies												
Topic 4. Insect Defenses	21		2		4		2		0,5		0,5	4
Topic 5. Population	22		2		4		2				1	4
Dynamics		0.6	10		1.0		10		-		-	1.0
Total for content module 3		36	10		16		10		2		3	16
	Mod	lule 4.	Syst	ema	atics	and T	Faxon	omy	1	1	I	1
Topic 1.Introduction to	23		2		4		2				0,5	4
Systematics												
The Arthropods and												
Hexapods												
Topic 2. Entognatha	24		2		6		2		0,5		0,5	6
Topic 3. Apterygota	25		4		6		4		0,5		0,5	6
	26											
Topic 4. Pterygota.	27		4		6		4		0,5		0,5	6
Hemimetabola	28											
Topic 5. Pterygota.	29		4		6		4		0,5		1	6
Holometabola	30											
Total for content module		60	16		28		16		2	3		28
4												
Total hours												
Course project (work) on	30											
(if included in the curriculum)			-	-	-		-		-	-	-	-
Total hours	240		60		90		60		8		12	 94

3. Topics of lectures

N⁰	Theme	hours
1	Introduction. Subject main objectives of the subject	2
1	"General entomology"	
2	Importance of Insects. Evolution and Diversity	2
2	External anatomy (exosceleton). The Integument and	2
3	Cuticular Structures	
4	The Head. Antenae.	2
5	Mouthpart and modification.	2
6	Torax (legs, wings and locomotion)	2
7	Abdomen	2
8	Egg Structure The types of insect's eggs	2

9	The types of insect's larva	2
10	The types of insect's pupa	2
11	Respiratory System	2
12	Circulatory System	2
13	Digestive & Excretory Systems	2
14	Reproductive System	2
15	Nervous System	2
16	Endocrine System and hormone	2
17	Muscular system of insects and locomotion	2
18	Embryogenesis	2
19	Morphogenesis	2
20	Survival Strategies	2
21	Insect Defenses	2
22	Population Dynamics	3
23	Topic 1.Introduction to Systematics	3
24	The Arthropods and Hexapods	3
25	Entognatha	3
26	Apterygota	3
27	Pterygota. Hemimetabola	3
	Total amount	60

4. Topics of laboratory (practical, seminar) classes

N⁰	Theme	hours
1	Introduction. Subject main objectives of the subject "General entomology"	5
2	Importance of Insects	5
3	Evolution and Diversity	5
4	External anatomy (exosceleton)	5
5	External anatomy. Head. Antenae. Mouthpart and modification.	5
6	Torax (legs, wings and locomotion) and Abdomen	15
7	Digestive & Excretory Systems	5
8	Circulatory System and Respiratory System	5
9	Reproductive System	5
10	Egg Structure	5
11	Embryogenesis	5
12	Morphogenesis	5
13	Introduction to Systematics. The Arthropods and Hexapods	6
14	Apterygota and Pterygota	8
15	Hemipteroids and Holometabola	6
16	Survival Strategies	5

17	Insect Defenses	5
18	Population Dynamics	5
	Total amount	90

5. Topics for self-study

N⁰	Topic title	Number of hours
1	Insect Societies: Termites	6
2	Insect Societies: Ants	6
3	Insect Societies: Bees	6
4	Insect Predation	6
5	Insect Parasitism	6
6	Medical Entomology	6
7	Ground-Dwelling Insects	6
8	Aquatic Insects	6
9	Pollination, Co-evolution, Mutualism	6
10	Defense and Mimicry	6
	Total hours	60

6. Methods of assessing expected learning outcomes:

- oral or written survey;
- interview;
- test;
- defending laboratory/practical, design/graphical works, projects;
- peer-to-peer assessment, self-assessment.

7. Tools for assessing expected learning outcomes:

- problem-based method;
- practice oriented studying method;
- case method;
- project education method;
- flipped classroom, mixed education method;
- research based method;
- learning discussions and debates method;
- team work, brainstorm method

8. Teaching methods:

The student's knowledge is assessed by means of a 100-point scale converted into the national grades according to the "Exam and Credit Regulations at NULES of Ukraine" in force

Educational activity	Results	Assessment
Module 1. Formation of	of entomology as a science. External anatomy	
Laboratory work 1.	To know and understand the task and	6
Laboratory work 2.	history of Entomology,	6
Laboratory work 3	To know external anatomy of insects, types	6
Laboratory work 4	of mouthparts, of which parts of them are	6
Laboratory work 5	composed as well types of staging heads,	6
Laboratory work 6	wing types and limbs, features anatomical	6
Laboratory work 7	Ba able to: determine mouthparts typesf	6
Laboratory work 8	the insect's wings and lags	6
Laboratory work 9	ability to cause damage, their features	6
Laboratory work 10	fertility	6
Self-study	Distinguish: main morphological and	10
Module control work 1	anatomical components insect structures	30
Total for module 1		100
Module 2.	Internal Anatomy and Physiology	100
Laboratory work 11	To know and understand the task and	6
Laboratory work 12	history of Entomology,	6
Laboratory work 13	To know external anatomy of insects, types of mouthparts, of which parts of them are composed as well types of staging heads, wing types and limbs, features anatomical	6
Laboratory work 14		6
Laboratory work 15		6
Laboratory work 16		6
Laboratory work 17	structure.	6
Laboratory work 18		6
Laboratory work 19		6
Laboratory work 20		6
Self-study		10
Module control work 2.		30
Total for module 2		100
Module 3. Growth and	Development and Behavior. Insects ecology	
Laboratory work 21	To know the embryonic development of	6
Laboratory work 22	insects biological role metamorphosis	6
Laboratory work 23	structure eggs and types oviposition,	6
Laboratory work 24	meaning each stage development in life	6
Laboratory work 25	insects.	6
Laboratory work 26	behind the larva stage	6
Laboratory work 27	life cycles	6
Laboratory work 28	Be able: identify of family belonging to insects by types of eggs and	6
Laboratory work 29		6
Laboratory work 30	oviposition, identify species affiliation	6
Self-study		10
Module control work 3.		30
Total for module 3		100
Module	4. Systematics and Taxonomy	
Laboratory work 11	-	6

8.1. Distribution of points by types of educational activities

Laboratory work 12		6
Laboratory work 13		6
Laboratory work 14		6
Laboratory work 15		6
Laboratory work 16		6
Laboratory work 17		6
Laboratory work 18		6
Laboratory work 19		6
Laboratory work 20		6
Self-study		10
Module control work 4.		30
Total for module 4		100
Class work	(M1 + M2+M3+	$(M4)/2*0,7 \le 70$
Exam/credit		30
Total for year	(Class work	$(x + exam) \le 100$
Course project/work		100
(<i>if any</i>)		100

8.1. Scale for assessing student's knowledge

Student's rating, points	National grading (exam/credits)
90-100	excellent
74-89	good
60-73	satisfactory
0-59	unsatisfactory

8.2. Assessment policy

Deadlines and exam retaking rules	<i>EXAMPLE:</i> works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer if there are valid reasons (e.g. a sick leave).
Academic integrity	EXAMPLE: cheating during tests and exams is prohibited (including using mobile
rules	devices). Term papers and essays must have correct references to the literature used
Attendance rules	<i>EXAMPLE:</i> Attendance is compulsory. For good reasons (e.g. illness, international internship), training can take place individually (online by the faculty dean's consent)

9. Teaching and learning aids

- e-learning course of the discipline

(https://elearn.nubip.edu.ua/course/view.php?id=512);

- lectures and presentations (in electronic form);
- textbooks, manuals, tutorials;
- guidelines for studying a discipline by full-time and part-time students;
- internship programmes of the discipline (if included in the curriculum).

10. Recommended sources of information

- 1. T.R. Stefanovska, S.V. Kucherovska., V.V. Kava. 2016, Agricultural Entomology, Komprint Press, Kiev, 375 p. ISBN 978-966-929-352-7.
- 2. Guidelines for Insecticide Use. Lexington: University of Kentucky, Department of Entomology, 1989.
- 3. Guidelines for the Control of Insect and Mite Pests of Foods, Fibers, Feeds, Ornamentals, Livestock, and Households. Washington, DC: United States Department of Agriculture, U.S. Government Printing Office, 1982.
- 4. Entomology (student reference) university of Missouri-Colombia Instruction materials laboratory, 1991 Insect Control Recommendations. Columbia: University of Missouri Extension, 1990