

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
SUMY NATIONAL AGRARIAN UNIVERSITY  
Faculty of Agrotechnologies and Natural Resource Management  
Department of Ecology and Botany**

**MODULE SYLLABUS**

**OC 3. Plant Population Ecology**

**(optional)**

**Implemented in the “Ecology” Academic Program**


**Area of specialization 101 “Ecology”**

***at the third (educational and scientific) level of higher education***

**Author:**



**V. G. Skliar, Doctor of Biological Sciences, Professor, Head of Ecology and Botany Department**

Module syllabus viewed and agreed at the Ecology and Botany Department meeting	Minutes № 19 dated June 07, 2021
	Head of Department  _____ (signature) <b>V. G. Skliar</b> (surname, initials)

**Approved by:**

Guarantor of the Academic program



I. M. Kovalenko

Dean of the Faculty

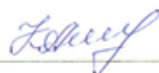


I. M. Kovalenko

Syllabus review (attached) is provided by :



V. G. Skliar



G.O. Klymenko

**Syllabus review data:**

The academic year in which changes are made	The Academic program attachment number with changes description	Changes revised and approved		
		Minutes No and date of the department meeting	Head of the Department	Guarantor of the Academic program

## 1. MODULE OVERVIEW

1.	Title	Population Ecology			
2.	Faculty/Department	Faculty of Agrotechnologies and Natural Resource Management / Department of Ecology and Botany			
3.	Type (compulsory or optional)	Optional			
4.	Program(s) to which Module is attached				
5.	Module can be suggested for (to be filled in for optional types)	Academic program "Ecology" Area of specialization 101 "Ecology"			
6.	Level of the National Qualifications Framework	NQF – Level 8			
7.	Semester and duration of module	3 Semester			
8.	ECTS credits number	5 credits (150 hours)			
9.	Total workload and time allotment	Directed study (classes)			Self-directed study
		Lectures	Practical classes /seminar classes	Labs	
	1 Semester	20	30		100
10.	Language of instruction	English and Ukrainian			
11.	Instructor/Coordinator of Module	Skliar Victoria Grygorivna			
11.1	Contact information	Doctor of Biological Sciences, Professor of the Department of Ecology and Botany, Room 25(a) v e-mail: <a href="mailto:skvig@ukr.net">skvig@ukr.net</a>			
12.	Module description	The history of formation of population researches, the main directions of studying of populations, structure of populations, approaches and methods of their observation are learned			
13.	Aim of the Module	To form in postgraduate students a comprehensive understanding of populations based on different approaches to their interpretation, to clarify the characteristics of populations in terms of nature conservation, to highlight the impact of environmental factors on populations, to reveal the organization of populations and ways to form them.			
14.	Module Dependencies (prerequisites, co-	1. Module is based on the use of the acquired learning outcomes during the study of the disciplines: "Plant in the experiment", "Methodology of			

	requisites, incompatible modules)	scientific research".  2. Module is the basis for EC "Biosozology", "Biometrics with the basics of modeling"
15.	The policy of academic integrity	When performing practical work, writing modular, attestation, test and examination work, the graduate student must follow the rules of academic integrity. If the facts of write-off or academic dishonesty are identified, the work done by the graduate student is not credited.
16.	Link to Moodle	<a href="https://cdn.snau.edu.ua/moodle/course/view.php?id=4785">https://cdn.snau.edu.ua/moodle/course/view.php?id=4785</a>

**CORRELATION BETWEEN MODULE LEARNING OUTCOMES (MLOs) AND  
PROGRAM LEARNING OUTCOMES (PLOs)**

**101 – Ecology**

MLOs:	PLOs (indicate the number according to the numbering given in the AP)				How assessed
	PLO <sub>6</sub> Apply methods of mathematical and geoinformation analysis and modeling of the current state and forecasting changes in ecosystems and their components.	PLO <sub>7</sub> Apply modern equipment independently for research in the field of ecology, environmental protection and sustainable use of nature.	PLO <sub>13</sub> Be able to carry out a comprehensive analysis of the state of populations and develop measures to ensure their protection and rational, inexhaustible use	PLO <sub>14</sub> Be able to assess the degree, nature of the negative impact of agricultural production and other types of anthropopression on humans, biodiversity, the environment; assess risks and propose measures for the greening of the agricultural sphere	
On successful completion of the module the PhD student will be able to:					
MLO 1. Know the essence of populations and the diversity of their categories			X		Report, discussion, oral questioning, test.
MLO 2. Know the types of population structure			X		Report, discussion, oral questioning, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks.
MLO 3. Know the characteristics of the population field and be able to evaluate them	X	X			Report, discussion, oral questioning, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks.
MLO 4. Know the methods of estimating the structure of populations		X	X		Report, discussion, oral questioning, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks. Mastering skills and abilities while observing.
MLO 5. Be able to recognize ontomorphogenetic states of different species during the study of ontogenetic		X			Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia

structure and calendar age of plants to determine the age structure					presentation. Verification and analysis of completed tasks. Observation over the graduate students in the process of performing tasks.
MLO 6. Be able to exercise morphometric analysis and determine the size structure of populations	X	X			Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks. Observation over the graduate students in the process of performing tasks.
MLO 7. Be able to identify the main morphoparameters of plants to determine the vitality structure	X	X			Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks. Observation over the graduate students in the process of performing tasks.
MLO 8. Know the essence and approaches to generalize the results of comprehensive population analysis			X		Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks.
MLO 9. Be able to generalize the results of a comprehensive population analysis and their basis developed approaches to environmental protection and environmental management	X		X	X	Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks. Observation over the graduate students in the process of performing tasks.

MLO 10. On the basis of specific indicators to be able to form forecasts for the continued existence of populations	X			X	Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks. Observation over the graduate students in the process of performing tasks.
MLO 11. Know the essence and methodology of population monitoring.		X		X	Report, discussion, oral questioning, team work, test. Preparation of a report with a multimedia presentation. Verification and analysis of completed tasks.

### 3. MODULE INDICATIVE CONTENT

Themes. List of issues to be considered within the theme	Distribution of hours				Learning resources 1
	Directed study			Self-directed study	
	Lectures	Practical classes	Labs		
<b>Theme 1.</b> Population level of organization of living material 1. Historical aspects of the formation of plant population ecology 2. Categories of populations 3. Comparative characteristics of plant and animal populations	2	2		8	1,2,3,4
<b>Theme 2.</b> The main directions in the study of plant populations 1. Identification of plant species in the study of vegetation 2. The main indicators that characterize the condition of plants 3. Statistical reliability of quantitative data	2	2		8	1,2,3,4,9
<b>Theme 3.</b> Plant species in geographical, ecological and phytocenotic space 1. Population as a form of existence of plant species 2. Local populations in geographical space 3. Local populations in the ecological space 4. Local populations in the phytocenotic space	2	2		8	1,2,3,4,8
<b>Theme 4.</b> Population fields 1. The size and configuration of the population field 2. Number of individuals and population density	1	2		8	1,2,3,4,11



3. The nature of the location of plants 4. Metapopulations, clones 5. Clones					
<b>Theme 5.</b> Life forms and ecological-phytocenotic strategies in plant species 1. Life forms of plants 2. Ecological and phytocenotic strategies 3. Functional types of plants	1	2		8	1,2,3,4,7
<b>Theme 6.</b> Features of morphogenesis of plants 1. Simple morphometry as a tool for studying the morphogenesis of plant species 2. Allometric analysis 3. Multidimensional morphometry 4. Geometric morphometry 5. Fluctuating asymmetry 6. Integrity of morphological structure	1	2		8	3,4,6,9
<b>Theme 7.</b> Specifics of reproduction and recovery process 1. Flowering and fruiting 2. Reproductive effort 3. Recovery 4. Endogenous and exogenous factors controlling reproduction 5. Vegetative reproduction 6. Reproductive success	2	2		8	5,7,9,11
<b>Theme 8.</b> Structure of plant populations 1. Principles of structural population analysis 2. Genetic structure 3. Gender structure 4. Age structure 5. Ontogenetic structure 6. Dimensional structure 7. Vitality structure 8. Final generalization of the results of complex population analysis	2	3		7	1,2,3,10
<b>Theme 9.</b> Populations of spore plants 1. Lichens 2. Higher spore plants	2	3		7	1,2,3,4,7
<b>Theme 10.</b> Agropopulations 1. The structure of agrophytocenoses 2. Populations of cultivated plants 3. Segetal plants 4. Management of cultivated plant and weed populations	1	3		7	8,9,11
<b>Theme 11.</b> Plant species under optimal conditions and ecological and phytocenotic stress 1. The concept of stress in the population ecology of plants 2. Individuals and populations of rare plant species on ecological-phytocenotic gradients 3. Morphological variability and plasticity as an expression of adaptive and stress reactions 4. Ontogenetic tactics 5. Functional connections of plant species 6. Interspecific associations	1	3		7	1,2,3,4,7

<b>Theme 12.</b> Dynamics of plant populations 1. General patterns of dynamics of phytopopulations 2. Forecasts of population dynamics based on their condition 3. Forecasts based on MVP methodology 4. Forecasts based on PVA methods 5. The effectiveness of the PVA method	1	2		8	1,2,3,10
<b>Theme 13.</b> Population monitoring 1. General principles of phytomonitoring organization 2. Features of population phytomonitoring	2	2		8	1,2,3,4,7
<b>Total</b>	20	30		100	

#### 4. TEACHING AND LEARNING METHODS

MLOs	Teaching methods (directed study)	Hours	Learning methods (self-directed study)	Hours
MLO 1. Know the essence of populations and the diversity of their categories	conducting lectures with the use of multimedia presentations and calculated practical work	4	- elaboration of unfamiliar (new) terms, - elaboration of additional material on relevant themes	9
MLO 2. Know the types of population structure	conducting lectures with the use of multimedia presentations and calculated practical work	4	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, - writing essays and / or abstracts	9
MLO 3. Know the characteristics of the population field and be able to evaluate them	conducting lectures with the use of multimedia presentations and calculated practical work	4	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, - writing essays and / or abstracts	9
MLO 4. Know the methods of estimating the structure of populations	conducting lectures with the use of multimedia presentations and calculated practical work	4	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, - writing essays and / or abstracts	10
MLO 5. Be able to recognize ontomorphogenetic states of different	conducting lectures with the use of multimedia presentations and calculated practical work	4	- elaboration of additional material on relevant themes, - analysis of the work	9

species during the study of ontogenetic structure and calendar age of plants to determine the age structure			performed during the tasks and preparation for the defense of works, - writing essays and / or abstracts	
MLO 6. Be able to exercise morphometric analysis and determine the size structure of populations	conducting lectures with the use of multimedia presentations and calculated practical work	5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, writing essays and / or abstracts	9
MLO 7. Be able to identify the main morphoparameters of plants to determine the vitality structure	conducting lectures with the use of multimedia presentations and calculated practical work	5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks, writing essays and / or abstracts	9
MLO 8. Know the essence and approaches to generalize the results of comprehensive population analysis	conducting lectures with the use of multimedia presentations and calculated practical work	5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, writing essays and / or abstracts	9
MLO 9. Be able to generalize the results of a comprehensive population analysis and their basis developed approaches to environmental protection and environmental management	conducting lectures with the use of multimedia presentations and calculated practical work	5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, writing essays and / or abstracts	9
MLO 10. On the basis of specific indicators to be able to form forecasts for the continued existence of populations	conducting lectures with the use of multimedia presentations and calculated practical work	5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works, writing essays and / or abstracts	9
MLO 11. Know the essence and methodology of population monitoring.		5	- elaboration of additional material on relevant themes, - analysis of the work performed during the tasks and preparation for the defense of works,	9

			writing essays and / or abstracts	
<b>Total</b>		50		100

## 5. ASSESSMENT

### 5.1. Summative assessment

#### 5.1.1. Intended learning outcomes methods:

<b>№</b>	<b>Summative assessment methods</b>	<b>Grades</b>	<b>Deadline</b>
<b>Module 1</b>			
1.	Practical work 1.1. Assessment of the state of population fields and clones	3 grades /3%	until the 3-d week
2.	Practical work 1.2. Morphometric analysis in the system of population studies	3 grades /3%	until the 4-th week
3.	Practical work 1.3. Assessment of ecological and phytocenotic strategy. Determination of functional types of certain plant species	3 grades /3%	until the 5-th week
4.	Practical work 1.4. Conducting allometric analysis and geometric morphometry	3 grades /3%	until the 6-th week
5.	Practical work 1.5. Determination of endogenous and exogenous factors controlling the reproduction of some plant species	3 grades /3%	until the 7-th week
6.	Module control	5 grades /5%	until the 8-th week
7.	Attestation (multiple choice test)	15 grades /15%	until the 8-th week
<b>Module 2</b>			
8.	Practical work 2.1. Conducting structural population analysis in natural ecosystems	4 grades /4%	until the 10-th week
9.	Practical work 2.2. Conducting structural population analysis in agricultural ecosystems	4 grades /4%	until the 11-th week
10.	Practical work 2.3. Determination of morphological variability and plasticity of plants.	4 grades /4%	until the 12-th week
11.	Practical work 2.4. Creating population forecasts based on MVP and PVA techniques	4 grades /4%	until the 13-th week
12.	Practical work 2.5. Organization of population phytomonitoring	4 grades /4%	until the 14-th week
13.	Module control	15 grades / 15%	until the 15-th week
14.	Exam	30 grades /30%	Examination period

### 5.1.2. ASSESSMENT CRITERIA

Component	Unsatisfactory	Satisfactory	Good	Excellent
<b>Module 1</b>				
Practical work 1.1. Assessment of the state of population fields and clones	<i>0 grades</i>	<i>1 grade</i>	<i>2 grades</i>	<i>3 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 1.2. Morphometric analysis in the system of population studies	<i>0 grades</i>	<i>1 grade</i>	<i>2 grades</i>	<i>3 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 1.3. Assessment of ecological and phytocenotic strategy. Determination of functional types of certain plant species	<i>0 grades</i>	<i>1 grade</i>	<i>2 grades</i>	<i>3 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 1.4. Conducting allometric analysis and geometric morphometry	<i>0 grades</i>	<i>1 grade</i>	<i>2 grades</i>	<i>3 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 1.5. Determination of endogenous and exogenous factors controlling the reproduction of some plant species	<i>0 grades</i>	<i>1 grade</i>	<i>2 grades</i>	<i>3 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.

Module control: control paper, oral questioning, written test (at the discretion of the lecturer)	0-5 grades			
	It is estimated depending on the number of correct answers			
Attestation (multiple choice test)	0-3 grades	3-7 grades	7-13 grades	13-15 grades
	It depends on the number of correct answers to the test	It depends on the number of correct answers to the test	It depends on the number of correct answers to the test	It depends on the number of correct answers to the test
<b>Module 2</b>				
Practical work 2.1. Conducting structural population analysis in natural ecosystems	0-1 grades	2 grades	3 grades	4 grades
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 2.2. Conducting structural population analysis in agricultural ecosystems	0-1 grades	2 grades	3 grades	4 grades
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 2.3. Determination of morphological variability and plasticity of plants.	0-1 grades	2 grades	3 grades	4 grades
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Practical work 2.4. Creating population forecasts based on MVP and PVA techniques	0-1 grades	2 grades	3 grades	4 grades
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.

Practical work 2.5. Organization of population phytomonitring	<i>0-1 grades</i>	<i>2 grades</i>	<i>3 grades</i>	<i>4 grades</i>
	Practical work is not done or done incorrectly	Not all the tasks are calculated	All requirements and tasks were carried out, but the graduate student is not sufficiently oriented in the theoretical material	All requirements and tasks are fulfilled, the obtained results are clearly interpreted, own opinion and vision of a certain problem are formed.
Module control: control paper, oral questioning, written test (at the discretion of the lecturer)	<i>0-15 grades</i>			
	It is estimated depending on the number of correct answers			
Exam	<i>0-5 grades</i>	<i>5-15 grades</i>	<i>15-27 grades</i>	<i>30 grades</i>
	The graduate student is not sufficiently oriented in the theoretical material, the tasks were not carried out	The graduate student is not sufficiently oriented in the theoretical material; the tasks are performed with errors	The graduate student is sufficiently oriented in the theoretical material; the tasks are completed	The graduate student has a good command of the theoretical material; all tasks are completed

## 5.2. Formative assessment:

№	The elements of the formative assessment	Date
1	Oral questioning after studying each theme	After completing the study of the theme
2	Oral answers to some questions during lectures and practical work	During the whole semester
3	Analysis of texts on the themes of the course processed by the graduate student independently	During the whole semester
4	Practical work defence	After delivery of the work
5	Oral feedback from the lecturer during the practical work	During the whole semester

## 6. LEARNING RESOURCES

### 6.1. The main sources

1. Дідух Я.П. Популяційна екологія. Київ.: Фітоцентр, 1998. – 192с
2. Царик Й.В. Популяційна екологія. Керування популяціями. Львів.: Вид-во центр ЛНУ імені Івана Франка, 2005. – 100с.
3. Злобин Ю.А., Скляр В.Г., Клименко А.А. Популяции редких видов растений: теоретические основы и методика изучения. – Суми: Університетська книга, 2018. – 439.

4. Злобин Ю.А. Популяционная экология растений: современное состояние, точки роста : монография. – Суми: Університетська книга, 2009. – 263 с.
5. Життєздатність популяцій рослин високогір'я Українських Карпат / за ред. Й.Царика. Львів: Меркатор, 2009. 172 с
6. Внутрішньопопуляційна різноманітність рідкісних, ендемічних і реліктових видів рослин Українських Карпат / за ред. М. А. Голубця, К .А. Малиновського. Львів: Поллі, 2004. 198 с.
7. Дмитрах Р.Г. Популяції різностатевих видів. Внутрішньопопуляційна різноманітність рідкісних ендемічних і реліктових видів рослин Українських Карпат / за ред. М. А. Голубця, К. А. Малиновського. Львів: Поллі, 2004. 198 с.
8. Жилияев Г.Г. Жизнеспособность популяций растений. Львов: ДПМНАНУ, 2005. 304 с.

## 6.2. Other sources

9. Falinska K. Ekologia roślin. Warszawa: Wydawnictwo Naukowe IWN, 1997. 451 s.
10. Жилияев Г.Г. Вплив поширення пилку на формування границь популяцій. Структура високогірних фітоценозів Українських Карпат. Київ: Наук. думка, 1993. С. 132–140.
11. Керування популяціями: методичні вказівки до лабораторних занять і організації самостійної роботи здобувачів / Укл.: Царик Й.В., Копко Т.І. – Львів: ЛНУ імені Франка, 2013. – 32 с.

## Information resources

1. Закон України «Про рослинний світ»: <https://zakon.rada.gov.ua/laws/show/591-14#Text>
2. Закон України «Про Червону книгу України»: <https://zakon.rada.gov.ua/laws/show/3055-14#Text>
3. Закон України «Про природно-заповідний фонд України»: <https://zakon.rada.gov.ua/laws/show/2456-12#Text>
4. Закон України «Про екологічну мережу України»: <https://zakon.rada.gov.ua/laws/show/1864-15#Text>



## Academic Program (Syllabus) Review

### PLANT POPULATION ECOLOGY

<b>Parameter by which the educational program (syllabus) of the educational component is assessed by the guarantor or a member of the project team</b>	<b>Yes</b>	<b>No</b>	<b>Comment</b>
Learning outcomes according the educational component (MLOs) correspond to the NQF	+		
Learning outcomes according the educational component (MLOs) correspond to the stipulated PLOs (for compulsory EC)	+		
The results of training in the educational component provide an opportunity to measure and assess the level of their achievement	+		

Member of the project group Ecology Academic Program

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V.G. Skliar

<b>Parameter by which the educational program (syllabus) of the educational component is assessed by the teacher of the relevant department</b>	<b>Yes</b>	<b>No</b>	<b>Comment</b>
General information about the educational component is sufficient	+		
Learning outcomes for the educational component (MLOs) correspond to the NQF The list of training resources contains the necessary software products to achieve DRN	+		
Learning outcomes for the educational component (MLOs) provide an opportunity to measure and assess the level of their achievement	+		
Learning outcomes (MLOs ) relate to the students competencies, not the content of the discipline (contain knowledge, skills, abilities, not topics of the curriculum of the discipline)	+		
The content of the EC is formed in accordance with the structural and logical scheme	+		
Learning activity (teaching and learning methods) allows students to achieve expected learning outcomes (MLOs)	+		
The educational component involves learning through research that is appropriate and sufficient for the corresponding level of higher education	+		
The assessment strategy within the educational component is in line with the policy of the University / faculty	+		
The provided assessment methods allow to assess the degree of achievement of learning outcomes in the educational component	+		
The workload of students is adequate to the volume of the educational component	+		
Recommended learning resources are sufficient to achieve learning outcomes (MLOs)	+		
The literature is relevant	+		
The list of training resources contains the necessary software products to achieve MLOs	+		

Reviewer

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G.O. Klymenko