

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

Department of Veterinary Expertise, Microbiology, Zohygiene and Quality and Safety of  
Livestock Products

«CONFIRMED»

Acting Head of Department

\_\_\_\_\_ T.I.Fotina

«\_\_» \_\_\_\_\_ 2019

## CURRICULUM

### Modeling and planning scientific experiment

Postgraduate full-time specialty students:

073 – «Management»;

091 – «Biology»;

133 – «Industry engineering»;

181 – «Food technology»;

201 – «Agronomy»;

202 – «Protection and quarantine of plants»;

204 – «Technology of production and processing of livestock  
products»;

211 – «Veterinary medicine»

Faculty: department of postgraduate and doctoral studies

2019 – 2020 academic year

Curriculum of the discipline « **Modeling and planning scientific experiment**» for postgraduate students by specialty: 073 – management; 091 – biology; 133 – industry engineering; 181 – food technology; 201 – agronomy; 202 - plant protection and quarantine; 204 – technology of production and processing of livestock products; 211 – veterinary medicine

Elaborated by: Fotina T.I. \_\_\_\_\_, Prof., Dr.S. (veterinary medicine), Professor of Department of Veterinary Expertise, Microbiology, Zohygiene and Quality and Safety of Livestock Products.

Curriculum is reviewed during the meeting of the Department of Veterinary Expertise, Microbiology, Zohygiene and Quality and Safety of Livestock Products. Protocol № 1 dated from 27 August 2019.

Acting Head of Department of Veterinary Expertise, Microbiology, Zohygiene and Quality and Safety of Livestock Products \_\_\_\_\_ T.I.Fotina

**Agreed:**

Head of of the Department of Postgraduate and Doctoral Studies \_\_\_\_\_ I.V. Lozynska

Methodist of department \_\_\_\_\_ H.O. Baboshina

Registered in the electronic data base. Date: \_\_\_\_\_ 2019 year

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### 1. Description of the Course

<b>Indicators</b>	<b>Branch of knowledge, training direction,</b>	<b>Characteristics of course</b>	
		<b>Full-time Studying</b>	<b>Part-time Studying</b>
Number of credits - <b>3</b>	Branch of knowledge: <i>Management and Administration, Biology, Mechanical Engineering, Manufacturing &amp; Technology, Agrarian Sciences &amp; Food, Veterinary Medicine, Postgraduate</i>	<i>Normative</i>	
Number of modules: 1	Specialty: <i>073 - Management; 091 - Biology; 133 - Industry mechanical engineering; 181 - Food Technologies; 201 - Agronomy; 202 - Plant Protection and Quarantine; 204 - Technology of production and processing of livestock products; 211 - Veterinary Medicine; 212 - Veterinary Hygiene, Sanitation and Expertise.</i>	<b>Academic year</b>	
		2019-2020	
		<b>Year of studying</b>	
		1	
		<b>Semester</b>	
		1	
<b>Hours:</b> Total - <b>90</b>		<b>Lectures</b>	
		12 hours	
		<b>Practical, seminar</b>	
		12 hours	
		<b>Laboratory</b>	
		-	-
		<b>Individual work</b>	
		66 hours	.
		<b>Final control form: exam</b>	
Hours per week: Classroom activities hours – 2 Individual work -4	Educational degree: <i>Doctor of Philosophy</i>		

**Note:**

Ratio of hours of classroom activities and individual work is:  
for full-time studying 35/65.

## 2. Aim and Tasks

Purpose: teaching the discipline - is the formation of postgraduate students of the scientific worldview, a holistic understanding of the methodology of scientific research and skills of practical application of specific methods of scientific search in professional activity, the study of principles and methods of management and implementation of scientific research, organization of the researcher's work, ethics and morals of science; acquisition of practical skills in organization of research, publication and implementation of research results.

The task of studying the discipline is to familiarize the graduate students with science as a system of knowledge, forms of its organization and management, a system of training of scientific personnel in Ukraine; give an idea of the methodology of research as a toolkit and as a science of methods and areas of their application in scientific activity; to reveal the value and essence of information support of scientific activity; to familiarize with organizational principles of scientific researches; give an idea of the stages of organizational and methodological preparation of scientific research; to familiarize with the method of experimental research and mathematical planning of the experiment; to familiarize with forms of approbation and realization of scientific researches; give an idea of the effectiveness of scientific activity and the method of its determination; to reveal the role and principles of scientific organization of work in scientific activity.

As a result of studying the discipline, the postgraduate student should:

to know: methodological bases of carrying out scientific researches; regulatory framework and its role in scientific research; methods of analysis and construction of scientific theories in economics; modeling of economic systems and processes; the procedure and main stages of the organization of scientific research; be familiar with the theoretical provisions for preparing the publication in international peer-reviewed publications; be able to structure a scientific publication in accordance with the requirements of international scientometric databases (eg Web of Science, Scopus, Web of Knowledge, Astrophysics, PubMed, Mathematics, Chemical Abstracts, Springer, Agris, GeoRef, etc.).

be able to: plan scientific research; to make and test scientific hypotheses; make a scientific description of the object of study; substantiate research methods, use of Internet space and Internet resources of science; evaluate the results of scientific research; to apply in practice general scientific, specific scientific and special methods of scientific research; use various forms of testing and implementation of scientific results; content and order of calculations of basic quantitative scientometric indicators of scientific activity efficiency (citation index, Hirsch index (h-index), impact factor (IF)).

### **The program of discipline**

The work program is approved by the Department of Veterinary Expertise, Microbiology, Zoohygiene and Safety and Quality of Livestock Products. Protocol No. 22 of June 3, 2019

#### **Module 1. Theoretical and methodological foundations of scientific research.**

##### **Topic 1. Science as a system of knowledge.**

The concept of science and its evolution. Components of science. The way to create a scientific theory. Specificity of research activities. Scientific knowledge. The concept of scientific research: the main features and characteristics.

**Topic 2: Methodological foundations of scientific knowledge.** Methodological bases of cognition: essence, characteristic, classification, methodology of scientific cognition; empirical and theoretical knowledge. Organizational and methodological principles of the research: general questions of methodology; principles and patterns of scientific search. Oral presentation of scientific information. Preparation for the performance. Asking questions and formulating answers.

##### **Topic 3. Information support of the research process.**

Classification of information support for scientific research. Basic concepts, terms and areas of information. National system of scientific and technical information. Types, sources of information and modes of access to it. Scientific information in documents.

**Topic 4. Problems of translation and editing of scientific texts.**

The essence and types of translation. Literal, adequate, abstract, abstract translation. Common mistakes when translating scientific texts into Ukrainian. Choosing a synonym for translation. Translation of terms. Features of editing scientific text. Errors in the content and structure of statements.

**Module 2. Organization of research and development work**

**Topic 5. Organization of work with international and abstract databases and scientometric platforms.**

The national abstract database "Ukrainika Scientific" and its work. Scientific data base - bibliographic and abstract database, tool for citation of scientific publications. Scientific data base of open access. Web of Science Science Platform: Science Citation Index Expanded, Social Sciences Citation Index, Arts & Humanities Citation Index, and Conference Proceedings Citation Index Scientific SciVerse Scopus Science Platform.

**Topic 6. Forms of collective discussion of professional problems.** Meetings, meetings, talks, discussions as a form of collective discussion. The art of negotiation. Meeting as a form of collective decision-making. "Brainstorming" as a heuristic form that activates the creative potential of the interlocutors during the collective discussion of the technology of "brainstorming".

**4. Structure of the Course**

Name of content modules and topics	Number of hours												
	full-time education						part-time education						
	Total	including					Total	including					
		L	P	La b	In d	I. W.		L	P	La b	In d	I. W.	
1	2	3	4	5	6	7	8	9	10	11	12	13	
Topic 1. Science as a system of knowledge.	15	2	2			11							
Topic 2: Methodological foundations of scientific knowledge.	15	2	2			11							
Topic 3. Information support of the research process.	15	2	2			11							
Topic 4. Problems of translation and editing of scientific texts.	15	2	2			11							
Topic 5. Organization of work with international and abstract databases and scientometric platforms.	15	2	2			11							
Topic 6. Forms of collective discussion of professional problems.	15	2	2			11							

<b>Total hours</b>	<b>90</b>	<b>12</b>	<b>12</b>			<b>66</b>					
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### 5. Topics and plans of lectures

#	Name of topics	Quantity of hours
1.	<p>Topic 1 Science as a system of knowledge. Plan</p> <ol style="list-style-type: none"> <li>1. The concept of science and its evolution.</li> <li>2. Components of science.</li> <li>3. The way to create a scientific theory.</li> <li>4. Specificity of research activities.</li> <li>5. Scientific knowledge.</li> <li>6. The concept of scientific research: the main features and characteristics.</li> </ol>	2
2.	<p>Topic 2: Methodological foundations of scientific knowledge Plan.</p> <ol style="list-style-type: none"> <li>1. Methodological bases of cognition: essence, characterization, classification, methodology of scientific cognition; empirical and theoretical knowledge.</li> <li>2. Organizational and methodological principles of the research: general questions of methodology; principles and patterns of scientific search.</li> <li>3. Oral presentation of scientific information.</li> <li>4. Preparation for the performance.</li> <li>5. Asking questions and formulating answers.</li> </ol>	2
3	<p>Topic 3: Information support of the research process. Plan</p> <ol style="list-style-type: none"> <li>1. Classification of information support for scientific research.</li> <li>2. Basic concepts, terms and areas of information.</li> <li>3. National system of scientific and technical information.</li> <li>3. Types, sources of information and modes of access to it.</li> <li>5. Scientific information in documents.</li> </ol>	2
4.	<p>Topic 4: Problems of translation and editing of scientific texts. Plan</p> <ol style="list-style-type: none"> <li>1. The essence and types of translation.</li> <li>2. Literal, adequate, abstract, abstract translation.</li> <li>3. Common mistakes when translating scientific texts into Ukrainian.</li> <li>4. Choosing a synonym during translation.</li> <li>5. Translation of terms.</li> <li>6. Features of editing scientific text.</li> <li>7. Errors in the content and structure of statements.</li> </ol>	2
5.	<p>Topic 5: Organization of work with international and abstract databases and scientometric platforms. Plan</p> <ol style="list-style-type: none"> <li>1. The nationwide abstract database "Ukrainika Scientific" and its work.</li> <li>2. Scientometric database - a bibliographic and abstract database, a tool for tracking the citation of scientific publications.</li> <li>3. Open access scientometric database.</li> <li>4. International scientometric databases.</li> <li>5. Criteria for the selection of international open access scientometric databases.</li> <li>6. Web of Science Science Platform: Science Citation Index Expanded, Social Sciences Citation Index, Arts &amp; Humanities Citation Index, and Conference Proceedings Citation Index. SciVerse Scopus science platform.</li> </ol>	2

6.	Topic 6: Forms of Collective Discussion of Professional Issues. Plan. 1. Meetings, meetings, negotiations, discussions as a form of collective discussion. 2. The art of negotiation. 3. Meeting as a form of collective decision-making. 4. “Brainstorming” as a heuristic form that activates the creative potential of the interlocutors during the collective discussion of the problem 5. Brainstorming technologies.	2
<b>Total:</b>		<b>12</b>

### 6. Topics of practical classes

#	<i>Name of topics</i>	<i>Quantity of hours</i>
1.	The main types of scientific research.	<b>2</b>
2.	Object, subject and purpose of scientific research.	<b>2</b>
3	Requirements for the definition of scientific research.	<b>2</b>
4.	Methods of scientific research: methodology and logic of scientific research; analysis, synthesis, induction, deduction, analogy; modeling, abstraction and concretization; system analysis and prediction.	<b>2</b>
5.	General patterns of scientific knowledge: scientific problem, hypothesis, theory, experiment.	<b>2</b>
6.	Logical bases of argumentation: characterization of argumentation; evidentiary reasoning; logical and substantive errors in scientific research.	<b>2</b>
<b>Total:</b>		<b>12</b>

### 7. Independent work

#	<i>Name of topics</i>	<i>Quantity of hours</i>
1	Communication and communication.	2
2	Communication features.	2
3	Types, types and forms of professional communication.	2
4	Basic laws of communication.	2
5	Communication strategies.	2
6	Non-verbal components of communication.	2
7	Gender aspects of communication.	2
8	The concept of business communication.	2
9	The concept of oratorical (rhetorical) competence.	2
10	Public speaking as an important means of communicating persuasion.	2
11	The art of argumentation.	2
12	Technique and tactics of argumentation.	2
13	Linguistic persuasion.	2
14	Communicative requirements for language behavior during public speaking.	3
15	Types of public broadcasting.	3
16	Presentation as a type of public service broadcasting.	3
17	Types of presentations.	3

18	Speech, stylistic and communicative principles of presentation.	3
19	Culture of public speaking perception.	3
20	Ability to ask questions, ability to listen.	3
21	Individual and collective forms of professional communication.	5
22	Formulation of results of scientific activity.	5
23	Plan, abstract as an important means of organizing mental work.	5
<b>Total:</b>		<b>66</b>

## 9. Methods of Training

1. Training Methods for Knowledge:
  - 1.1. Verbal: narrative, explanation, discussion (heuristic and reproductive), lecture, instruct, work with the book (read, transfer, discharge, scheduling, reviewing, summarizing, making tables, charts, reference compendia etc.).
  - 1.2. Visual: demonstration, illustration.
  - 1.3. Practical: practical work, exercise, production practices.
2. Methods for studying the nature of the logic of knowledge.
  - 2.1. Analytical
  - 2.2. Synthesis
  - 2.3. Inductive method
  - 2.4. Deductive method
3. Methods for studying the nature and level of independent mental activity of students.
  - 3.1. Problem (problem-information)
  - 3.2. Partly-search (heuristic)
  - 3.3. Exploratory
  - 3.4. Reproductive
  - 3.5. Explanatory demonstration
4. Active learning methods – use of technical training, brainstorming, debates, roundtables, business and role-playing games, training, use of problem situations, self-knowledge, the use of educational tests and controlling the use of basic lectures.
5. Interactive learning technology – the use of multimedia technology.

## 10. Methods of control

1. Rating control of a 100-point scale assessment ECTS.
2. An intermediate control during the semester (interim certification).
3. Criteria assess of the current work of students:
  - the level of knowledge demonstrated in practical classes;
  - active in the discussion of issues brought to the class;
  - quick control during classes;
  - self-study topics in general or specific issues;
  - perform analytical calculation tasks;
  - writing essays;
  - test results;
  - writing assignments during the tests;
  - production situations, cases and more.
4. Direct consideration in the final assessment of student performance of certain individual tasks:
  - educational and practical study of the presentation of results and more.

## 11. Points for the Total Score a Student Gets



Ongoing testing and independent work											Together for the module	The final test is an exam	Total
Module 1 – 70 points													
T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8	T 9	T 10	T 11	70	30	100
6	6	6	6	6	6	6	7	7	7	7			

### Evaluation Criteria and ECTS

NATIONAL MARK	ECTS	DEFINITION OF ECTS	POINTS
excellent	A	<p>90-100 points ("excellent") - (with ECTS - A - almost without errors - 95 - 100 points; allowed a small number of errors - 86 - 94 points):</p> <ul style="list-style-type: none"> <li>- Theoretical part - student systematically provides complete, specific, logical answers as oral and written. Uses more independently selected information on the topic is not limited to material or abstract teaching complex.</li> <li>- Practical part - 100-percent attendance at health facilities (except confirmed valid reasons) and total quality performance of all tasks in accordance with the guidelines. Entry and display of high skills in performing laboratory and practical problems. Independent of the preparatory phase to work on assignments, search for material to perform analytical and situational tasks, compiling individual algorithm decide tasks and situations. Protecting PSI required.</li> <li>- Individual work - timely, complete and efficient implementation of the objectives of training complexes (tests), using sources outside the NMC. Positive performance tests 86-100%.</li> <li>- Individual tasks - timely, complete and high-quality preparation and execution descriptive tasks (jobs), settlement and graphic papers, essays, visual aids, etc.. Manifestation own initiative in the preparation and execution of individual tasks.</li> <li>- Other criteria for evaluating knowledge - responsibility, intelligence, creative line of work, creative thinking, the ability to express their own opinions and knowledge, the ability to rethink amounts of information, the ability to optimal behaviour in different situations and so on.</li> </ul>	90 - 100
good	B	<p>above average with a few errors:</p> <ul style="list-style-type: none"> <li>- Theoretical part - student gives full, concrete answers as oral and written. May use additional information on the topic, and not limited to material or abstract teaching complex.</li> <li>- Practical part - 80-100% presence and working of missed</li> </ul>	82 – 89

		<p>PSI. Complete quality performance of all tasks in accordance with the guidelines. Entry and display good skills in performing laboratory and practical problems. Possible independent of the preparatory phase to work on assignments, search for material to perform analytical and situational problems. Protecting PSI required.</p> <ul style="list-style-type: none"> <li>- Individual work - timely, complete and efficient implementation of the objectives of training complexes (tests), you can use additional sources of information. Positive performance tests for 71 - 85%.</li> <li>- Individual tasks - timely, complete and high-quality preparation and execution descriptive tasks (jobs), settlement and graphic papers, essays, visual aids, etc.. Possible manifestation of his own initiative in the preparation and execution of individual tasks.</li> <li>- Other criteria for evaluating knowledge - responsibility, intelligence, possible manifestation of the creative direction of work, the ability to express their own opinions and knowledge.</li> </ul>	
	C	generally work is not very good, with a number of errors	75 – 81
sufficient	D	<p>not bad, but a lot of mistakes</p> <ul style="list-style-type: none"> <li>- Theoretical part - student gives sufficient answer both oral and written. Limited material outline or teaching complex.</li> <li>- Practical part - 80-100-percent testing missed PSI according to the guidelines. Acquiring and sufficient manifestation skills in performing laboratory practical tasks Protection PSI is not required.</li> <li>- Individual work - timely performance objectives of training complexes (tests). Positive performance tests for 60 - 70%.</li> <li>- Individual objectives - Timely preparation and implementation of descriptive tasks (jobs), settlement and graphic papers, essays, visual aids, etc..</li> <li>- Other criteria for evaluating knowledge - a manifestation of the desire to gain knowledge on the subject.</li> </ul>	69 – 74
	E	<b>Enough - performance meets the minimum criteria</b>	60 – 68
insufficient	FX	35 - 59 points ("poor") - (with ECTS-FX - need to work before you get a positive evaluation).	35 – 59
	F	1 - 34 points ("poor") - (with ECTS - F - thorough and elaborate).	1 - 34

## 12. Suggested Reading

Bozema B. Research Collaboration and Team Science. A state-of-the-Art Review and Agenda. Springer briefs in entrepreneurship and innovation [Electronic resource] / Barry Bozema, Craig Boardman. – Ohio: Columbus, 2014. – 59 p. – The mode of access: <https://books.google.com.ua/books?id=31clBAAAQBAJ&pg=PA27&dq=science+research+for+managers+2014&hl=ru&sa=X&ved=0CCoQ6AEwAmoVChMIsar8I7DaxgIVCyDbCh1aKAKR#v=onepage&q=science%20research%20for%20managers%202014&f=false>.

2. Bright Wilson E. An Introduction to Scientific Research / Edgar Bright Wilson. – New York, Dover Publications Inc, 2011. – 383 p.

3. Bryman A. Barriers to Integrating Quantitative and Qualitative Research [Electronic resource] / Alan Bryman // Journal of Mixed Methods Research. – Vol. 1. – #1, January, 2010. – P. 8–22. – The mode of access: <http://mmr.sagepub.com/content/1/1/8.short?rss=1&ssource=mfc>.
4. Collis J. Business Research: A Practical Guide for Undergraduate and Postgraduate Students / Jill Collis, Roger Hussey. – 4<sup>th</sup> edition, December 27, 2013. – 443 p.
5. Dawson C. Practical Research Methods / Dawson Catherine. –New Delhi: UBS Publishers'Distributors, 2012. – 315 p.
6. Denscombe M. The good research guide: for small scale social research projects / Martyn Denscombe. – Maidenhead: McGraw-Hill, Open University Press, 5<sup>th</sup> edition, 2014. – 310 p.
7. Durojaye Oyedolapo B. Peace Research Methods / Durojaye Oyedolapo B. – National Open University of Nigeria, 2012. – 244 p.
8. Johnson C. Management Project Guidelines / Johnson C. – Bradford: University of Bradford, School of Management, 2014. – 72 p.
10. Klietsova N. V. Prediction of possible changes in investment of the agricultural sector of Sumy region / N. V. Klietsova // collective monograph: Current issues of modern economy / Part 2. – Uman, 2011. – P. 163–167. (in Ukrainian)
11. Kothari C. R. Research Methodology – Methods and Techniques / Kothari C. R. – New Delhi: Wiley Eastern Limited, 2011. – 112 p.
12. Kumar R. Research Methodology – A Step-by-Step Guide for Beginners / Kumar Ranjit. – 2nd.ed., Singapore: Pearson Education, 2015. – 246 p.
13. Kunova V. Current Issues of Science and Research in the Global World [Electronic resource] / Vlasta Kunova, Martin Dolinsky. – London: Taylor and Frances Group, Uk; CRC Press: Balkema, 2015. – 369 p. – The mode of access: <https://books.google.com.ua/books?id=SA7NBQAAQBAJ&pg=PR9&dq=science+and+research+2014&hl=ru&sa=X&ved=0CBwQ6AEwAGoVChMI6erOoabaxgIVYXdyCh3UBQC9#v=onepage&q=science%20and%20research%202014&f=false>.
14. Mykhailov A.M. Using economic and mathematical methods in economic research. Information management at the level of local self-government. Science national team for ed. Kristina Kzhizhanovskaya. Poland Warsaw: Publishing House. 2010. p. 67-78
15. Mykhailov A.M. Methodological approaches and a system of indicators for determining the investment climate in the agrarian sector of the economy. *Economy of agroindustrial complex*. 2016. No. 12. p. 76-83 (in Ukrainian)
16. Mykhailova L.I., Mykhailov A.M. Methodological principles of the study of world and regional markets for agricultural products and foodstuffs. Problems of foreign economic relations development and attraction of foreign investments: regional aspect // Collected authors. - Collection of scientific works. Donetsk: Donetsk National University (Open Journal Systems) 2013. T.1. 410 s. P.235-237. (in Ukrainian)
17. Mykhailov A., Kharchenko T. Economic-mathematical modeling of investment-active development of the agrarian sector of Ukraine's regions in the context of attraction of foreign investments // Modelling of the mechanisms to restore the national economy: Collective monograph / [Edited by: O.Vlasiuk, O. Ilyash, M. Osinska, W. Olszewski, S.Hrynkevych]. – Vol. 3. Bydgoszcz, Poland: University of Economy in Bydgoszcz, Publishing House, 2017. 315p. P.123-144
18. Mykhailov A.M. Investment resources of the agrarian sector of Ukraine's economy: scientific fundamentals, state, prospects: monograph. Sumy: FOP Litovchenko E. B., 2017. 300 p. (in Ukrainian)
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26. Tashakkori A. Exploring the Nature of Research Questions in Mixed Methods Research [Electronic resource] / Abbas Tashakkori and John W. Creswell // Journal of Mixed Methods Research. – Vol. 1. – #3, July, 2015. – P. 207–211. – The mode of access: <http://www.sociologyofeurope.unifi.it/upload/sub/documenti/Tashakkori%20-%20Editorial%20-%20Exploring%20the%20Nature%20of%20Research%20Questions%20in%20Mixed%20Methods%20Research.pdf>.

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