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**Federal State Autonomous Educational Institution of Higher Education "Peoples'
Friendship University of Russia"
Agrarian and technological institute**

(наименование основного учебного подразделения (ОУП)-разработчика ОП ВО)

EDUCATIONAL AND METHODOLOGICAL COMPLEX

INNOVATION TECHNOLOGIES IN STANDARDIZATION

(наименование дисциплины/модуля)

Recommended by ISSC for specialty

27.03.01 Standardization and metrology

(код и наименование направления подготовки/специальности)

The development of the discipline is carried out within the framework of the implementation of the main professional educational program of higher education (EP HE):

Standardization and metrology

(наименование (профиль/специализация) ОП ВО)

2023 г.

1. THE AIMS OF DISCIPLINE

The purpose of the discipline Innovation technologies in standardization: To form a system of professional knowledge, abilities, skills in modern technologies for the production of food products in students

2. REQUIREMENTS TO THE DEVELOPMENT RESULTS OF DISCIPLINE

Learning discipline of «**Innovation technologies in standardization**» aims at the formation of the following competencies General professional competencies:

Table 2.1. The list of competencies formed by students in the course of mastering disciplines (results of mastering disciplines)

Code	Competence	Competence achievement indicators (within this discipline)
GPC -3	Able to use fundamental knowledge in the field of standardization and metrological support to improve in professional activity.	GPC-3.1. Description of basic information about the objects and processes of professional activity using professional terminology GPC-3.2. The choice of a scheme for transferring unit sizes from standards and exemplary measuring instruments to working measuring instruments
GPC -4	Able to use fundamental knowledge in the field of standardization and metrological support to improve in professional activity.	GPC-4.1. Calculation and evaluation of the effectiveness of work, processes in the field of standardization and metrological support GPC-4.2. Selection and justification of work efficiency criteria, processes in the field of standardization and metrological support
GPC -5	Able to solve the problems of the development of science, technology and technology in the field of standardization and metrological support, taking into account the legal regulation in the field of intellectual property.	GPC-5.1. Selection of a regulatory document regulating intellectual property rights to objects of professional activity GPC-5.2. Search for up-to-date information in the register of patent search for objects of professional activity
GPC -6	Able to make scientifically grounded decisions in the field of standardization and metrology based on methods of system and functional analysis.	GPC-6.1. Search for up-to-date information in the register of patent search for objects of professional activity GPC-6.2. Choice of a normative document regulating intellectual property rights to objects of professional activity
GPC -7	Able to make scientifically grounded decisions in the field of standardization and metrology based on methods of system and functional analysis.	GPC-7.1. Selection and justification of the mathematical model of the process, drawing up an experiment plan to determine the desired parameters GPC-7.2. Selection of methods and means

		of measurement for conducting an experiment and evaluating the effectiveness of solutions in the field of standardization and metrology
GPC -8	Able to develop technical documentation (including in electronic form) related to professional activities, taking into account the current quality standards.	GPC-8.1. Drawing up documents in the field of standardization (instructions, methods) GPC-8.2. Presentation of documentation using information and computer technologies
PC -3	Able to introduce new methods and means of technical control	PC-3.1. Development of a plan, frequency of verification (calibration) of measuring instruments, certification of testing equipment PC-3.2. Conducting metrological traceability of results

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF EP HE

Discipline of «**Innovation technologies in standardization**» refers to a block of elective disciplines in the variable part of the curriculum.

As part of the EP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned learning outcomes discipline of «**Innovation technologies in standardization**»

Table 3.1. The list of components of the EP HE that contribute to the achievement of the planned results of the development of the discipline

Code	Competence name	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
GPC -3	Able to use fundamental knowledge in the field of standardization and metrological support to improve in professional activity.	Methods and systems of standardization; Food product identification; Food analysis methods; Training practice	Examination of regulatory documents; Jurisprudence in standardization; Accreditation systems; Certification of technological processes, production; Industrial practice; Practice pre-diploma
GPC -4	Able to use fundamental knowledge in the field of standardization and metrological support to improve in professional activity.	Methods and systems of standardization; Food product identification; Food analysis methods; Training practice	Examination of regulatory documents; Product design fundamentals; Industrial practice; Practice pre-diploma
GPC -5	Able to solve the problems of the development of science, technology and technology in the field of standardization and metrological support, taking	Food product identification; Food analysis methods; Training practice	Industrial practice; Practice pre-diploma

	into account the legal regulation in the field of intellectual property .		
GPC -6	Able to make scientifically grounded decisions in the field of standardization and metrology based on methods of system and functional analysis.	Food product identification; Food analysis methods; Training practice	Examination of regulatory documents; Jurisprudence in standardization; Certification of technological processes, production; Industrial practice; Practice pre-diploma
GPC -7	Able to make scientifically grounded decisions in the field of standardization and metrology based on methods of system and functional analysis.	Methods and systems of standardization; Food analysis methods; Training practice	Industrial practice; Practice pre-diploma
GPC -8	Able to develop technical documentation (including in electronic form) related to professional activities, taking into account the current quality standards.	International resources in standardization; Fundamentals of technical regulation; Training practice	Certification of technological processes, production; Examination of regulatory documents; Accreditation systems; Industrial practice; Practice pre-diploma
PC -3	Able to introduce new methods and means of technical control	Organization and technology of tests; Methods and systems of standardization; Практика учебная	Industrial practice; Practice pre-diploma

* - filled in in accordance with the matrix of competencies and CMS EP HE

4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

Total labour input of discipline of **Innovation technologies in standardization** input is **4** credits

Table 4.1. Types of educational work by periods of mastering EP HE for full-time education

Type of training	TOTAL hours	Semesters			
		6			
Contact work, ac. h.	34	34			
Including:					
Lectures (L)					
Laboratory work (LW)	17	17			
Practical exercises (PE)	17	17			
Individual work of students, ac. h.	110	110			
Control (exam/test with assessment), ac. h.					
The total complexity of the discipline	ac. h.	144	144		

	credits	4	4			
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Table 4.2. Types of educational work by periods of mastering EP HE for part-time education

Type of training		TOTAL hours	Semesters			
			7			
Contact work, ac. h.		34	34			
Including:						
Lectures (L)						
Laboratory work (LW)		17	17			
Practical exercises (PE)		17	17			
Individual work of students, ac. h.		110	110			
Control (exam/test with assessment), ac. h.						
The total complexity of the discipline		ac. h.	144	144		
		credits	4	4		

Table 4.3. Types of educational work by periods of mastering EP HE for distance education

Type of training		TOTAL hours	Session			
			2			
Contact work, ac. h.		20	20			
Including:						
Lectures (L)						
Laboratory work (LW)		10	10			
Practical exercises (PE)		10	10			
Individual work of students, ac. h.		120	120			
Control (exam/test with assessment), ac. h.		4	4			
The total complexity of the discipline		ac. h.	144	144		
		credits	4	4		

5. THE CONTENT SECTIONS OF THE DISCIPLINE

Table 5.1. The content of the discipline (module) by type of educational work

Name of the discipline section	Contents of the section (topic)	Type of educational work*
Section 1 Principles of standardization	Topic 1.1. Basic principles of standardization in the Russian Federation to ensure the achievement of the goals and objectives of its development.	L,S
Section 2 Technology and scientific and technological progress	Topic 2.1. Innovations as an object of innovative management	L,S
	Topic 2.2. The influence of technical progress on the creation of fundamentally new technologies.	L,S

	Topic 2.3. The main directions of the technological process in the agro-industrial complex. High-tech technologies, their role and importance in modern production.	L,S
	Topic 2.4. Innovative technologies in the production of food raw materials and food products.	L,S
	Topic 2.5. Metrological aspects of food safety.	L,S
	Topic 2.6. Production methods and technologies at all stages of safe food production.	L,S
	Topic 2.7. Metrological assurance of quality control of food products.	L,S
	Topic 2.8. Modern methods and means of non-destructive express control of product safety and quality.	L,S
	Topic 2.9. Decision making and development of safety recommendations.	L,S
Section 3 Technical regulation in the development of scientific and technical innovation in the agro-industrial complex	Topic 3.1. The role of advanced technologies in the global economic system.	L,S
	Topic 3.2. The role of technology and technological infrastructure in the modern economy.	L,S
	Topic 3.3. High technology products and macro technology.	L,S
	Topic 3.4. Ways of integration into the world market of high technology products.	L,S
	Topic 3.5. Metrology, standardization and certification as activities to ensure the quality and safety of products.	L,S
Section 4 System analysis of the effectiveness of technological innovation	Topic 4.1. Generalization of economic, organizational, scientific and technical factors of technology options into indicators of the technical and economic level.	L,S
	Topic 4.2. Legislative and regulatory framework for conformity assessment. Enterprise development management trends	L,S
	Topic 4.3. Classification groups of innovations: technological (product and process); degree of novelty (internationally and for the Russian Federation); significance based on scientific discoveries and inventions (new technological level).	L,S
Section 5 Organization of the production process at the enterprise	Topic 5.1. Formation of quality in the production process	L,S
	Topic 5.2. The production process as a set of labor and natural processes.	L,S
	Topic 5.3. Basic requirements for the	L,S

	organization of the production process	
	Topic 5.4. The production program and methods of its formation.	L,S
	Topic 5.5. Anti-crisis solutions in technologies and equipment for the food industry	L,S
	Topic 5.6. Creation of high-tech processes for the production of new competitive products	L,S
	Topic 5.7. Classification and principles of operation of technological equipment and rules for its safe operation.	L,S

* - filled in only for full-time education: L - lectures; LW - laboratory work; S - seminars.

6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Logistics of discipline

Type of audience	Equipment of the audience	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
Specialized Audience	An auditorium for seminars, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment. (rooms 351, 440, 335)	A set of specialized furniture, Electric wall screen Cactus MotoExpert 150x200cm (CS-PSME-200X150-WT), Projector BenQ MH550. Software: Microsoft products (OS, office suite, including MS Office / Office 365, Teams)
For independent work of students	An auditorium for independent work of students (can be used for classes and consultations), equipped with a set of specialized furniture (room 335)	A set of specialized furniture, Electric wall screen Cactus MotoExpert 150x200cm (CS-PSME-200X150-WT), Projector BenQ MH550. Software: Microsoft products (OS, office suite, including MS Office / Office 365, Teams)

* - the audience for independent work of students is indicated MANDATORY!

7. EDUCATIONAL AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Main literature:

- 1. Printed editions:**
- V.I. Teplov, N.M. Beletskaya, L.A. Dogaeva Functional food products: Textbook. - M: A-Prior, 2015. -- 240 p.
- V.G. Versan Technical regulation: theory and practice -M.: JSC "Publishing house" Economics ", 2013
- Shevchenko V.A., Karaseva A.P., Lazarev V.G., Commodity research and examination of goods M. INFRA - M. 2014

5. Okrepilov V.V. Technical regulation in Russia M.: Economy - 2015
6. Antipova L.V., Bezryadin N.N., Titov S.A. and others Physical methods of control of raw materials and products in the meat industry M.: GIORD. - 2014

Electronic and printed full-text materials:

1. Budkevich, E. V. Biomedical nanotechnologies: textbook / E. V. Budkevich, R. O. Budkevich. - St. Petersburg: Lan, 2020. - 176 p. - ISBN 978-5-8114-3868-6. — Text: electronic // Doe: electronic library system. - URL: <https://e.lanbook.com/book/130172>
2. Shapovalov Alexander Borisovich, Smurov Andrey Valerievich Ecology and nanotechnologies // Life of the Earth. 2020. Issue number 1 volume 42, p.38-45— Text: electronic // Cyberleninka: scientific electronic library. — URL: <https://cyberleninka.ru/article/n/ekologiya-i-nanotehnologii>.
3. Lozovsky, V. N. Nanotechnologies in electronics. Introduction to the specialty: textbook / V. N. Lozovsky, S. V. Lozovsky. - 2nd ed., revised. - St. Petersburg: Lan, 2019. - 332 p. - ISBN 978-5-8114-3986-7. — Text: electronic // Doe: electronic library system. - URL: <https://e.lanbook.com/book/113943>

Additional literature:

Electronic and printed full-text materials:

1. Federal law from 28/12/2013 № 412-FL "On the accreditation of the national accreditation system"
2. Federal law from 27/12/2002 № 184-FL "On Technical Regulation"
3. Federal Law №102-FL of 26/06/2008 "On ensuring the uniformity of measurements" (as amended on July 13, 2015)
4. Federal Law of 02/01/2000 №29-FL "Quality and food safety" (as amended on July 13, 2015).
5. Federal Law of 06/29/2015 №162-FL "Standardization in the Russian Federation."
6. Federal Law №2300-1 07/02/1992 "Protection of Consumers' Rights (as amended on July 13, 2015).
7. Presidential Decree of 24.01.2011, №86 «About the Unified National Accreditation System" (as amended on October 28, 2015).
8. Technical Regulations of of the Customs Union 022/2011 "On food safety"
9. GOST R ISO 9001 - 2015 Quality Management System. Requirements: National Standard of the Russian Federation / Federal Agency on Technical Regulating and Metrology. - M.: Tehnormativ, 2015.
10. GOST 1.1 The Interstate system for standardization. Terms and Definitions
11. GOST R 1.2. Standardization in the Russian Federation. national standards of the Russian Federation. Rules of development, approval, renewal and cancellation
12. GOST R 1.4. Standardization in the Russian Federation. Standards organizations. General provisions
13. GOST R 1.5 Standardization in the Russian Federation. national standards of the Russian Federation. Rules for the structure, presentation, design and designations
14. GOST R 1.8 Standardization in the Russian Federation. interstate standards. Rules of the Russian Federation works on the development, application, renewal and termination of application
15. GOST R 1.9 Standardization in the Russian Federation. Mark of conformity to national standards of the Russian Federation. Picture. The order of application
16. GOST 1.12 Standardization in the Russian Federation. Terms and Definitions
17. I. Lifits Standardization, Metrology and Certification: Textbook for universities. - 6 th ed., Revised. And add. - M.: Yurayt-2015 - 350 p.:
18. V. Versan Technical regulation: the theory and practice-M.: JSC "Publishing house" Economy ", 2011

19. N. Dunchenko Quality management in the food industry: A manual for schools. - 3rd Ed. - Moscow: Dashkov i K, 2014. - 212 p.

Web resources

1. RUDN ELS and third-party ELS, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System - PFUR EBS <http://lib.rudn.ru/MegaPro/Web>
- ELS "University Library Online" <http://www.biblioclub.ru>
- EBS Yurayt <http://www.biblio-online.ru>
- ELS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" <http://e.lanbook.com/>

2. Databases and search engines:

- NCBI: <https://p.360pubmed.com/pubmed/>
- Bulletin of RUDN University: access mode from the territory of RUDN University and remotely <http://journals.rudn.ru/>
- Scientific library Elibrary.ru: access via RUDN University IP addresses at: <http://www.elibrary.ru/defaultx.asp>
- ScienceDirect (ESD), "FreedomCollection", "Cell Press" ID "Elsevier". There is remote access to the database, access to RUDN University IP addresses (or remotely using an individual login and password).
- Google Scholar is a free full-text search engine for scientific publications of all formats and disciplines. Indexes full texts of scientific publications. Access mode: <https://scholar.google.ru/>
- Scopus - scientometric database of publishing house "Elsevier". Access to the platform is carried out by RUDN University IP addresses or remotely. <http://www.scopus.com/>
- Web of Science. Access to the platform is carried out by RUDN University IP addresses or remotely. <http://login.webofknowledge.com/>

Educational and methodological materials for independent work of students in the development of the discipline/module:*

1. Guidelines for students on mastering the discipline «**Innovation technologies in standardization**»

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of the discipline in TUIS!

8. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES IN THE DISCIPLINE

Evaluation materials and a point-rating system* for evaluating the level of competence formation (part of competences) based on the results of mastering the discipline

«**Innovation technologies in standardization**» are presented in the Appendix to this Work Program of the discipline.

* - OM and BRS are formed on the basis of the requirements of the relevant local normative act of the Peoples' Friendship University of Russia.

DEVELOPERS:

Associate Professor of
Agroengineering Department

position, department name

Signature

M.V. Kochneva

initials, surname

Senior Lecturer, AED

position, department name

Signature

N.G.Khomenets

initials, surname

HEAD OF THE DEPARTMENT:

Director of agroengineering
department

department name

Signature

A.A. Poddubsky

initials, surname

PROGRAM MANAGER:

Associate Professor of
Agroengineering Department

position, department name

Signature

M.V. Kochneva

initials, surname

Application

Evaluation materials and a point-rating system for assessing the level of competence formation (part of competences) based on the results of mastering the discipline "Certification of technological processes, production"

Passport of the fund of assessment tools by discipline «Innovation Technologies In Standardization»

Direction / Specialty: 27.03.01 Standardization and Metrology

Discipline: Innovation Technologies in Standardization

Controlled competence code or part thereof	Supervised discipline section	FES (forms of control of the level of development of BEP)											Points section	
		Classroom work					Independent work					Exam / Pass		
		Interview	Test	Colloquium	Test work	LW execution	Work in class	Homework performance	Abstract	Execution SGW	Execution CW			
GPC -3 GPC -4	Section 1: Principles of standardization						5							5
GPC -6 PC -3	Section 2: Technology and scientific and technological progress			5			5							10

Correspondence table of scores and grades

BRS scores	Traditional RF estimates	ECTS grades
95-100	5	A
86-94		B
69-85	4	C
61-68	3	D
51-60		E
31-50	2	FX
0-30		F
51 - 100	Passed	Passed

Description of ECTS grades

A	“Excellent” - the theoretical content of the course has been mastered completely, without gaps, the necessary practical skills for working with the mastered material have been formed, all the training tasks provided for by the training program have been completed, the quality of their implementation has been estimated by a number of points close to the maximum.
B	“Very good” - the theoretical content of the course is mastered completely, without gaps, the necessary practical skills for working with the mastered material are basically formed, all the training tasks provided for by the training program are completed, the quality of most of them is estimated by a number of points close to the maximum.
C	“Good” - the theoretical content of the course has been mastered completely, without gaps, some practical skills in working with the mastered material are not sufficiently formed, all the training tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum number of points, some types of tasks have been completed with errors.
D	“Satisfactory” - the theoretical content of the course has been partially mastered, but the gaps are not significant, the necessary practical skills for working with the mastered material are basically formed, most of the training tasks provided for by the training program have been completed, some of the completed tasks may contain errors.
E	“Mediocre” - the theoretical content of the course is partially mastered, some practical work skills are not formed, many training tasks provided for by the training program are not completed, or the quality of some of them is estimated by a number of points close to the minimum.
FX	“Conditionally unsatisfactory” - the theoretical content of the course has been partially mastered, the necessary practical skills have not been formed, most of the training tasks provided for by the training program have not been completed, or the quality of their implementation has been assessed by a number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the implementation of educational tasks.

F	“Definitely unsatisfactory” - the theoretical content of the course has not been mastered, the necessary practical skills have not been formed, all completed training tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the training tasks.
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Positive grades, upon receipt of which the course is credited to the student as passed, are grades A, B, C, D and E.

A student who has received an **FX** grade in a discipline of an educational program is obliged, after consultation with the corresponding teacher, to successfully complete the required minimum amount of study work provided for by the training program within the time frame established by the study unit, and submit the results of these works to this teacher. If the quality of the work is found to be satisfactory, then the final FX grade is raised to E and the student is allowed to continue training.

If the quality of the study papers remains unsatisfactory, the final grade is reduced to F and the student is submitted for expulsion. In the case of receiving an F or FX grade, the student is considered for expulsion, regardless of whether he has any other debts in other disciplines. Order of the Rector of RUDN University No. 996 dated December 27, 2006)

Grade	Unsatisfactory		Satisfactory		Good	Excellent	
ECTS score	F	FX	E	D	C	B	A
Numerical value according to ECTS	2		3	3+	4	5	5+
Sum of points for BRS	0-30	31-50	51-60	61-68	69-85	86-94	95-100