

Ministry of education and science of Ukraine
Sumy national agrarian university
Faculty of economics and management
Department of management named by L.Mykhailova

Syllabus of the educational component

Wastemanagement and circular economics

(selective)

Specialty	073 Management
Educational program	Management
HE level	doctor of philosophy the third (educational and scientific) level of higher education

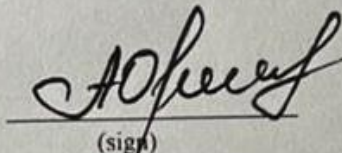
Creator:



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named after professor L.Mykhailova

Considered, reviewed and approved on the meeting
of the Management Department named after professor L.Mykhailova

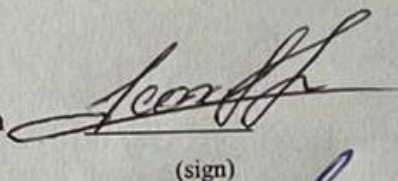
The head
of the department


(sign)

Alvina ORIEKHOVA
(name)

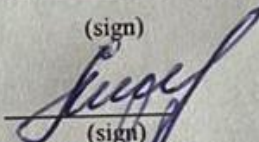
Approved:

Guarantor of the educational program


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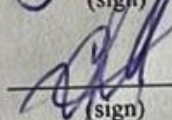
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Dean of the Faculty


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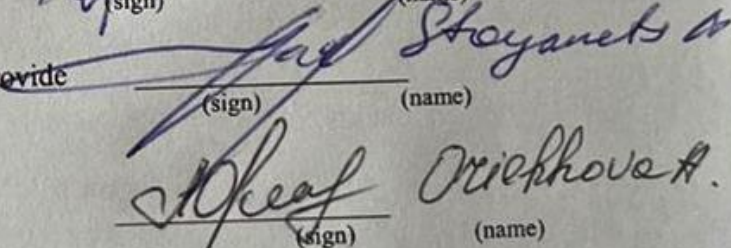
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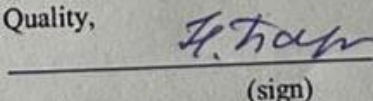
Svitlana Yeroshchuk
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A review of the work program has been provide


(sign)

Stoyanets
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Methodist of the Department of Education Quality,
licensing and accreditation


(sign)

(Baranik N.)
(name)

Registered in the electronic database: date: 06.07. 2024

Information on viewing the work program (syllabus):

Academic year in which the changes are made	The number of the annex to the work program with a description of the changes	The changes were reviewed and approved		
		Date and number of the protocol of the meeting of the department	Head of department	Guarantor of EP

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Name of EC	Wastemanagement and circular economics		
2.	Faculty/Department	Faculty of Economic and Management / Department of Management named by L.Mykhailova		
3.	State of EC	Selective		
4.	Program/Specialty (programs) of which the OC is a component (to be filled in for mandatory OCs)			
5.	Program/Specialty	Scientific and educational program «Management». The third (educational and scientific) level of higher education. Level of higher education: doctor of philosophy. Field of study: 07 - «Management and administration». Specialty: 073 - «Management».		
6.	Level of NFC	8		
7.	Semester and studying duration	Full-time 14 weeks, 4 semestr		
8.	ECTS credits number	5		
9.	Total workload and time allotment Language of instruction	Directed study		
		Lectures	Seminars	Self-directed study
		20	30	100
10.	Lecturer/Leader of educational component	English		
11.	ECTS credits number	Tetiana Shevchenko , PhD in Management, assos.professor of Management department named by L.Mykhailova		
11.	Contacts	Tetiana.shevchenko@snau.edu.ua		
12.	Educational component description	The educational component "Wastemanagement and Circular Economy" is an important component of specialist training and plays a significant role in future practical activities. The educational component covers the principles and practical aspects of effective waste management aimed at reducing their volume and minimizing the harmful impact on the environment. The course examines modern waste management models, approaches to resource reuse and the principles of a circular economy, where waste becomes new resources. Applicants study methods of sorting, recycling, disposal and strategic approaches to the transition to environmentally friendly technologies. The goal of the course is to develop in students in-depth knowledge and practical skills in waste management and the implementation of the principles of a circular economy to reduce the negative impact on the environment, optimize resources and create sustainable environmental solutions. Course objectives: 1. To familiarize students with the basic concepts of waste management and the circular economy. 2. Develop an understanding of the impact of waste on ecosystems and human health. 3. Promote environmental responsibility and a conscious attitude towards resources and their use.		

13.	Educational component aim	The aim of the course is to develop in-depth knowledge and practical skills in waste management and the implementation of circular economy principles to reduce environmental impact, optimize resources and create sustainable environmental solutions. Course objectives: 1. To introduce students to the basic concepts of waste management and the circular economy. 2. To develop an understanding of the impact of waste on ecosystems and human health. 3. To promote environmental responsibility and a conscious attitude towards resources and their use
14.	Prerequisites for educational component studying, connection with other educational components of EP	1. The educational component is based on the study of EC: OC3, OC5, OC6 2. The educational component is the basis for studying EC: organization of preparation of scientific publications and writing of dissertations
15.	Policy of academic integrity	According to the Code of Academic Integrity of the Sumy NAU, academic integrity is a set of principles, rules of behavior of participants in the educational process, aimed at forming an independent and responsible personality, capable of solving tasks in accordance with the educational level in compliance with the norms of law and social morality. Observance of academic integrity by students of higher education involves independent performance of educational tasks, tasks of current and final control, learning results. It is expected that students of higher education will adhere to the principles of academic integrity, being aware of the consequences of its violation, which is determined by the regulatory documents of the Sumy National Agrarian University, in particular the Code of Academic Integrity, the Regulations on the Prevention and Detection of Academic Plagiarism at the Sumy NAU (a full list of regulatory documents is posted on the university's website. https://snau.edu.ua/viddil-zabezpechennya-yakosti-osviti/zabezpechennya-yakosti-osviti/akademichna-dobrochesnist/). For violation of academic integrity, students of higher education may be held to the following academic responsibility: - repeated assessment (test, exam, credit, etc.); - repeated completion of the training course; - warning; - issuing a reprimand; - expulsion from the university; (Part 5 of Article 48 of the draft Law of Ukraine "On Education"); - arrest or restriction of liberty, or deprivation of liberty, with deprivation of the right to hold certain positions or engage in certain activities with a fine.

2. LEARNING OUTCOMES UNDER THE EDUCATIONAL COMPONENT AND THEIR RELATIONSHIP WITH PROGRAM LEARNING OUTCOMES

Learning outcomes for EC (MLOs): On successful completion the educational component, the student will be able...	Program learning outcomes, PLOs (specify the number according to the numbering given in EP) ¹			How is assessed
	PLO ₅	PLO ₉	PLO ₁₀	
MLOs 1. Understand the essence and principles of waste management; the role of the circular economy and the interconnection of the components of the system of relations in the organization, formulate the problem and evaluate the results.		x		Cases
MLOs 2. To study the structural elements of the waste management system, to use the latest tools, technologies and research methodology in combination with modern science of the circular economy, to know approaches to forming a waste management system.	x			Individual task
MLOs 3. Apply the latest theories and concepts of the circular economy, create a resource concept of waste management in accordance with the research objectives.			x	Multiple choice test

PLO₅ Deeply understand the general principles and methods of management sciences, as well as the methodology of scientific research, apply them in one's own research in the field of management and in teaching practice.

PLO₉. Demonstrate a systematic scientific worldview, rationally understand the challenges facing science in the context of socio-economic and environmental problems of today (ethical dilemmas, values, global social transformations).

PLO₁₀. Develop management theories, concepts and principles for the implementation of the principles of sustainable development at different levels of management, integrate the obtained research results into logical structures for solving theoretical and practical management problems in accordance with the topic of own research.

3. CONTENT OF THE EDUCATIONAL COMPONENT (CURRICULUM PROGRAM)

Topic. List of issues to be considered within the topic	Distribution within the general time budget			Learning resources
	Class work		Individual work	
Topic 1. Introduction to waste management and circular economy The concept of waste: classification and main types. Circular economy as an alternative to the linear model. Purpose, objectives and main principles of the educational component.	2	4	10	1, 2, 3, 4, 5, 6, 7, 14, 16
Topic 2. Environmental and economic impact of waste The impact of waste on the environment, human health and the economy. Overview of global trends and statistics on waste accumulation. Environmental and social consequences of pollution.	2	2	10	1, 2, 3, 4, 5, 6, 7, 14
Topic 3. Strategies for waste reduction and minimization The principles of "3R" (Reduce, Reuse, Recycle). Regulatory and economic tools for reducing waste. Implementation of waste management systems at the company level.	2	4	10	1, 2, 3, 4, 5, 6, 7, 9, 14
Topic 4. Waste collection, sorting and transportation systems Methods for waste collection and transportation. Waste sorting technologies: automated and manual methods. Logistics models for optimizing waste management processes.	2	2	10	1, 2, 3, 4, 5, 6, 7, 14, 16
Topic 5 Circular economy: concepts and examples of successful implementation Basic principles of the circular economy. Closed-loop business models: servitization, life cycle extension, reuse. Examples of the implementation of circular practices in the world.	2	2	10	1, 2, 3, 4, 5, 6, 7, 14, 15, 16
Topic 6. Ecological design and production in the context of the circular economy Ecological design of products and the life cycle. Materials that promote recyclability and long-term use. Production planning taking into account the principles of the circular economy.	2	2	10	1, 2, 3, 4, 5, 6, 7, 9, 14

Topic 7. Policy and regulation in the field of waste management. International and national regulatory acts. The role of legislation in shaping approaches to waste management. Integration of environmental policy at the level of companies and communities.	2	2	10	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13
Topic 8. Economic mechanisms and incentives for the circular economy Economic models of supporting the circular economy: taxes, subsidies, credits. Mechanisms for stimulating innovations in the field of recycling and reuse. Overview of support for circular initiatives at the global level.	2	6	10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 17
Topic 9. Social responsibility and public engagement in waste management The role of the public in shaping an environmental culture. Social responsibility of business in waste management. Tools for informing and engaging the population in sorting and recycling.	2	4	10	1, 2, 3, 4, 5, 6, 7, 11, 14, 15, 16
Topic 10. Prospects for the development of the circular economy and waste management Innovations in waste management: digital solutions, smart technologies. Prospects for the development of policies and technologies of the circular economy. Key challenges and future directions of the industry.	2	2	10	1, 2, 3, 4, 5, 6, 7, 13, 17
Total	20	30	100	

4.TEACHING AND LEARNING METHODS

MLO	Teaching methods (work to be carried out by the teacher <u>during classroom classes</u> , consultations)	Teaching methods (what types of educational activities should the student <u>perform independently</u>)
MLOs 1. Understand the essence and principles of waste management; the role of the circular economy and the interconnection of the components of the system of relations in the organization, formulate the problem and evaluate the results.	Verbal methods: lecture, explanation, educational discussion	Method of ready knowledge
	Visual methods: demonstration	Method of formation of abilities and skills
	Practical methods: practical works, individual calculation and analytical tasks	Research method

	Method of tutoring	Methods of checking and evaluating knowledge, abilities and skills
MLOs 2. To study the structural elements of the waste management system, to use the latest tools, technologies and research methodology in combination with modern science of the circular economy, to know approaches to forming a waste management system.	Verbal methods: lecture, explanation, educational discussion	Method of ready knowledge
	Visual methods: demonstration	Method of formation of abilities and skills
	Practical methods: practical works, individual calculation and analytical tasks	Research method
	Method of tutoring	Methods of checking and evaluating knowledge, abilities and skills
MLOs 3. Apply the latest theories and concepts of the circular economy, create a resource concept of waste management in accordance with the research objectives.	Verbal methods: lecture, explanation, educational discussion	Method of ready knowledge
	Visual methods: demonstration	Method of formation of abilities and skills
	Practical methods: practical works, individual calculation and analytical tasks	Research method
	Method of tutoring	Methods of checking and evaluating knowledge, abilities and skills

The following teaching methods will be used during lectures and practical classes:

Explanation. Interpretation of concepts, phenomena, principles, terms, etc., mainly during the teaching of new material.

Educational discussion. This is a discussion of an important issue, an exchange of ideas between students of higher education and/or a teacher, aimed not only at the assimilation of new knowledge, but also at the creation of an emotionally saturated atmosphere that would contribute to a deep penetration into the truth.

Illustration. Using presentations and other media content to reinforce material being explained, discussed or tasks being performed.

Demonstration. Presentation by the teacher of educational materials in dynamics (use of professional programs, situations, etc.).

Written and oral test tasks. Independent concentration and reproduction of acquired knowledge and skills in conditions of limited time and sources of information.

Cases. Algorithmic search for a solution through the use of typical methods, which, unlike the solution of cases, does not require identification of the problem and original approaches to its solution.

Demonstration and discussion of presentations. Visual display of the media accompaniment of the oral presentation with elements of the discussion.

Comparison. With its help, common and distinctive features of objects and phenomena are established.

Exercises. In their essence, they are multiple repetitions of certain actions or types of activity with the aim of their assimilation, which is based on understanding and is accompanied by conscious control and correction. The following types of exercises are used in the educational process: preparatory (they prepare students of higher education to perceive new knowledge and ways of applying it in practice); introductory (contribute to the assimilation of new material based on the distinction of related concepts and actions); trial (first tasks to apply newly acquired knowledge); training (contribute to the formation of skills in standard conditions: according to a sample, instruction, task); creative (the content and method of execution are close to real life situations); control (mainly educational: written, graphic, practical exercises).

Analysis method. Its essence consists in the study of objects or phenomena according to individual signs and relations, in the division into elements, and the understanding of the connections between them.

5. EVALUATION BY THE EDUCATIONAL COMPONENT

5.1.1 To assess the expected learning outcomes, it is provided:

№	Methods of summative assessment	Points / Weight in the overall assessment	The date of compilation
1.	Cases	40/40%	6,13 week
2.	Individual task	30/30%	14 week
3.	Test	30/30%	14 week

5.1.2 Evaluation criteria

Component	Unsatisfactory	Satisfactory	Good	Excellent
Cases	< 15 points	15-24 points	25-35 points	36-40 points
	The task requirements have not been fulfilled	Most of the requirements are met, but individual components are missing or insufficiently disclosed, there is no analysis of other approaches to the issue	All requirements of the task have been fulfilled	All the requirements of the task were met, creativity and thoughtfulness were demonstrated, and an own solution to the problem was proposed
Individual task	<18 points	18-21 points	22-26 points	27-30 points
	the correct answer was provided for less than 60% of the tasks	the correct answer was provided for 60%-74% of the tasks	the correct answer was provided for 75%-89% of the tasks	90% or more tasks were answered correctly
Test	<18 points	18-21 points	22-26 points	27-30 points
	The task requirements have not been fulfilled	Most of the requirements are met, but some components are missing or insufficiently disclosed	All requirements of the task have been fulfilled	All the requirements of the task were met, creativity and thoughtfulness were demonstrated, and an own solution to the problem was proposed

5.2 . Formative assessment:

5.2.1 To evaluate the current progress in education and understand the areas of further improvement, is provided

№	Elements of formative assessment	Date
1	Testing after learning the topics № 2,4,5,7-10.	3 week, 7 week
2	Verbal feedback from the teacher during classroom work	constantly
3	Oral survey during classes and feedback from the teacher during classroom work	constantly
4	Conversation and discussion during classroom lectures	constantly
5	Written feedback from the teacher based on the results of	6,13 week

	the INHW	
6	Discussion of situational tasks and presentations on the subject of independent study of the discipline	constantly
7	Verbal feedback from the teacher and students after the exam	14 week

Self-assessment can be used as an element of summative assessment and formative assessment.

5.3 Total number of points for EC and rating scale

The total number of points for the educational component is 100 points.

5.3.1 Evaluation scale operating at the University:

The sum of points for all types of educational activities	Evaluation on a national scale	
	For an exam, course project (work), practice, qualification work	For a credit
90 – 100	excellent	passed
82-89	good	
75-81		
69-74		
60-68	satisfactory	
35-59	not satisfactory with the possibility of retaking	not passed with the possibility of retaking
0-34	not satisfactory with obligatory repeated study of the discipline	not passed with obligatory repeated study of the discipline

REFERENCES

1. Public consultation. 2030 Climate Target Plan. (<https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12265-2030-Climate-Target-Plan/public-consultation>)
2. Buying green! A hand book on green public procurement. 3rd edition. (<https://ec.europa.eu/environment/gpp/pdf/Buying-Green-Handbook-3rd-Edition.pdf>)
3. A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. COM(2018) 773, Brussels, 28.11.2018 (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0773&from=EN>)
4. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. COM(2019) 640 final. (https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf)
5. European Green Deal: possibilities for Ukraine. <https://dixigroup.org/storage/files/2020-05-26/european-green-dealwebfinal.pdf>
6. Circularity Gap Report 2022: five years of analysis by Circle Economy https://circulareconomy.europa.eu/platform/sites/default/files/1._report_cgr_global_2022pdf
7. Circular Economy Action Plan. For a cleaner and more competitive Europe. 2020. https://ec.europa.eu/environment/circulareconomy/pdf/new_circular_economy_action_plan.pdf
8. Han, Y., Shevchenko, T., Yannou, B., Ranjbari, M., Shams Esfandabadi, Z., Saidani, M., Bouillass, G., Bliumska-Danko, K., & Li, G. (2023). Exploring How Digital Technologies Enable a Circular Economy of Products. *Sustainability*, 15(3), 2067. <https://doi.org/10.3390/su15032067>
9. Han, Y., & Shevchenko, T. (2021). Exploring incentive mechanism in smart E-waste management system in China. *Bulletin of Sumy National Agrarian University*. 4(90), 50-59. <https://doi.org/10.32845/bsnau.2021.4.8>
10. Han, Y., & Shevchenko, T. (2023). Exploring digital technologies and smart systems used in e-waste management in China: seminal research themes. *Bulletin of Sumy National Agrarian University*. 3(95), 3-9. <https://doi.org/10.32782/bsnau.2023.3.1>
11. Shevchenko, T., Qu, D., & Li, G. (2022). Smart E-waste Management in China: A Review. *Proceedings of 2nd Congress on Intelligent Systems (CIS2021)*, Springer Book Series, Singapore, 2, 515-533. https://doi.org/10.1007/978-981-16-9113-3_38 (Scopus, [Web of Science](#)).
12. Han, Y. (2021). Advancing e-waste management system based on intelligent technologies in China. *Proceedings of the VII International Scientific and Practical Conference “Modern Management: Trends, Problems and Prospects for Development”*, April 14, 2021. Alfred Nobel University, Dnipro (online) P.24-26. https://duan.edu.ua/en/index.php?option=com_content&view=article&id=467&catid=13
13. Han, Y. (2021). Research on incentive mechanism of e-waste recycling in China. *Proceedings of Conference “Answers on nowadays economic and environmental challenges in a vision of scientists”*, June 29, 2021. Ukraine, P.72-75. <https://odeku.edu.ua/wp-content/uploads/materiali-konf-2021-epsdn.pdf>
14. Han, Y. (2023). Advancing rural waste management program in China: enlightenment from the case study. *Proceedings of the scientific and practical conference “Economic development in the context of integration into the European research and innovation area”*, June 23-24, 2023. Ukraine, P.27-30. <https://molodyivchenyi.ua/omp/index.php/conference/catalog/book/41>
15. Han, Y., Shevchenko, T., & Zhao F. (2023). Research on the Development of Circular Economy in Modern Agriculture. *Proceedings of IV International scientific and theoretical*

conference “Science of XXI century: development, main theories and achievements”, June 30, 2023. Finland, P.11-14. <https://previous.scientia.report/index.php/archive/issue/view/30.06.2023>

16. Han, Y., Yi D. (2023). Application of smart technology in waste sorting management in rural China. Proceedings of X International scientific and practical conference “Science and technology: problems, prospects and innovations”, July 6-8, 2023. Japan, P.179-183. <https://sci-conf.com.ua/x-mizhnarodna-naukovo-praktichna-konferentsiya-science-and-technology-problems-prospects-and-innovations-6-8-07-2023-osaka-yaponiya-arhiv/>