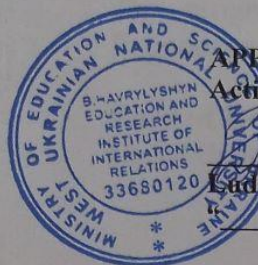


MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
 WEST UKRAINIAN NATIONAL UNIVERSITY  
 BOHDAN HAVRYLYSHYN EDUCATION AND RESEARCH  
 INSTITUTE OF INTERNATIONAL RELATIONS



APPROVED BY  
 Acting Director of BHERIIR

*Ludmyla HAVRYLYUK -YENSEN*  
 \_\_\_\_\_  
 2024



APPROVED BY  
 Vice Rector for Scientific  
 and Pedagogical Work

*Victor OSTROVERHOV*  
 \_\_\_\_\_  
 2024

**WORKING PROGRAM\***  
 on discipline  
 “Basics of circular economy”

Degree of higher education – Bachelor  
 Branch of knowledge – 05 Social and Behavioral sciences  
 Specialty – 051 Economics  
 Educational and professional program – International Economics

Department of International Economics

Form of study	Course	Semes-ter	Lectures (hours)	Practical classes (hours)	Individual student's work (hours)	Train-ing (hours)	Self-studies of students (hours)	Total (hours)	Credit (sem.)
Full-time	3	5	32	14	3	6	95	150	credit

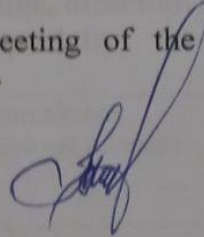
*30. of work*

Ternopil – WUNU  
 2024

The working program is compiled Candidate of Economic Science, Associate Professor  
Olena Karas.

The program was approved at the meeting of the Department of International  
Economics by Protocol №1 from 27/08/24

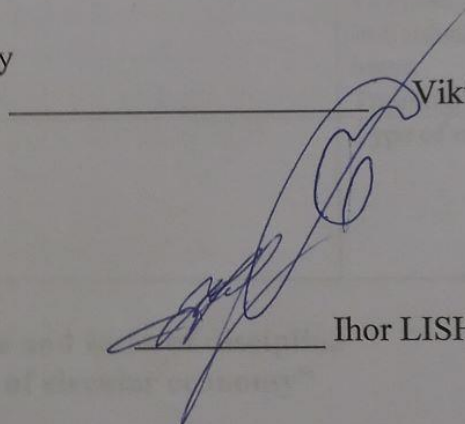
Head of Department  
Dr. of Econ. Sciences, Prof.



Iryna ZVARYCH

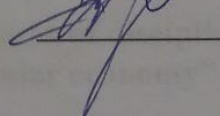
The program is considered and approved by the support group of specialty  
051 "Economics"  
Protocol № 2 from 30/08/24

Head of the support group of specialty  
Doctor of Economic Science, Prof.



Viktor KOZIUK

Guarantor  
Doctor of Economic Sciences, Prof.



Ihor LISHCHYNSKYI

## **STRUCTURE OF THE WORKING PROGRAM OF DISCIPLINE** **“Basics of circular economy”**

### **1. Description of discipline “Basics of circular economy”**

<b>Discipline – “Basics of circular economy”</b>	<b>Branch of knowledge, direction of training / specialty</b>	<b>Description of discipline</b>
Number of credits ECTS – 5	Branches of knowledge: 05 Social and behavioral sciences	Discipline status: selective Language of study: English
Number of test modules – 3	Specialty: 051 Economics	Year of study – 3 Semester – 6
Number of content modules –2	Educational and qualification level – bachelor	Lectures – 32 hours Practical classes – 14 hours
Total quantity of hours – 150		Self-studies of students – 95 hours Individual student’s work – 3 hours Training: 6
Weekly hours –11 Including classroom hours – 4		Type of result control – credit

### **2. Purpose and tasks of discipline** **“Basics of circular economy”**

#### **2.1. Purpose of the discipline**

The purpose of teaching the discipline " Basics of circular economy " is to form students' managerial thinking, knowledge system and acquisition of practical skills in recycling as a process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products. Recycling can benefit the community and the environment that is why it is necessary to study the basic concepts and directions of its development in order to analyze its efficiency and implement the recycling principles into the student’s mentality and their future professional skills.

#### **2.2. Tasks of discipline study**

The discipline " Basics of circular economy " is aimed at students mastering theoretical knowledge and acquiring practical skills of analyzing the global inclusive circular economy and recycling, understanding the global problems of limited natural resources and its consumption taking into account the global economic and ecological risks, understanding the sustainable development goals and an environmentally

sustainable society, the necessity of the recycling technologies implementation and principles of international waste trade, understanding the peculiarities of recycling policy in Ukraine and other foreign countries.

### **2.3. The names and description of competences the formation of which provides the study of discipline:**

- ability to explain economic and social processes and phenomena on the basis of theoretical models, analyze and interpret the results;
- ability to use modern information technology data analysis in the study of the global market for goods and services effectively;
- ability to substantiate economic decisions on the basis of understanding the laws of economic systems and processes and with the use of modern methodological tools;
- ability to identify the reasons for the formation of a global inclusive circular economy and recycling;
- ability to analyze the EU Circular Economy Action Plan for the forming institutional basis of national circular policies of countries;
- ability to identify the dominant trends in the development of recycling in EU member states to determine the leaders and outsiders of the circular economy;
- ability to study current trends in the generation and processing of waste unused products and secondary raw materials in Ukraine to justify their impact on the formation of a circular environment in Ukraine.

### **2.4. Prerequisites for studying the discipline:**

Prerequisites for studying the discipline "Basics of circular economy" provide for the mastery of the following courses: "International Economics", "Macroeconomics", "Microeconomics", "Finance", "International Statistics".

### **2.5. Results of study:**

Studying the discipline "Basics of circular economy" forms professional competencies that give students knowledge and skills to solve practical problems, such as:

- apply the acquired theoretical knowledge to solve practical one's tasks and meaningfully interpret the results obtained;
- analyze the essence and characteristics of international innovation activities in the field of market relations;
- perform interdisciplinary analysis of socio-economic phenomena and problems in one or more professional fields.
- demonstrate basic skills of creative and critical thinking in research and professional communication;
- develop a recycling activity taking into account international requirements and standards.

### **3. CONTENT OF THE COURSE**

#### **“Basics of circular economy”**

#### **Lecture 1. The global problems of resource supply and resource consumption.** **Global economic and environmental risks**

1. *Modern problems of resource consumption of the economies in the global economics conditions.* Global problems of humanity. Interconnectedness and scale of economic processes in the world. Increasing the cost of natural resources. Consumption boom. The law of unlimited needs growth.

2. *The problem of limited economic resources.* Economic resources: land, labor, capital, entrepreneurial skills, information. Rarity of economic resources and the problem of economic choice. Production capacity curve. The impact of globalization on the economic development nonlinearity.

3. *Modern global economic and environmental risks.* Challenges facing humanity: pandemic, climate change, environmental degradation, biodiversity loss, natural resources crisis, environmental damage, economic crises, overproduction crisis. Pollution of the environment. Methods of increasing global resilience: creating new formats of partnership, strengthening trust and developing measures for joint response of states to risks.

*Literature: 1-16*

#### **Lecture 2. The circular economy basics: genesis, structure, peculiarities and the functioning principles**

1. *The essence of the circular economy, the prerequisites for its formation and development.* Definition of the term "circular economy". Closed cycle economics. Categorical content of the circular economy. Reasons for the transition to a circular economy. Globalization. STR. The fourth industrial revolution. Resource constraints. Transformation of the resource-raw material model of economic development. Environmental challenges. Socio-ecological development of society. Economics of environmentalism.

2. *The structure of the circular economy.* Elements of the circular economy. Social and environmental responsibility. R-principles of circular economy (reduce, reuse, recycle). Reducing the consumption of scarce resources. Demand for secondary material resources. Methods and tools of circular economy.

3. *Models of circular economy.* Circular suppliers. Resources recovery. Sharing platforms. Product life extension. Product as a service.

4. *Features and principles of the circular economy functioning.* Specifics of the circular economy. Evolutionary development of R-principles of forming the concept of circular economy. Principle "10-R": refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, recover. Meso, micro and macro implementation levels of the circular economy principles. Prospects for the development of the circular economy.



5. *Implementing the circular economy: goals, objectives and results.* Rational consumption and production models. Ecological sustainability of cities and settlements. Creating a sustainable infrastructure. Rational use of limited natural resources. Programs for the transition to a circular economy.

*Literature: 1-16*

### **Lecture 3. Recycling basics: the essence and methods**

1. *The essence and historical principles of recycling development.* Economic and environmental significance of recycling in the international economy. Recycling as a strategic basis for the development of the "green economy". Waste disposal. Solid household waste. Waste recycling. Industrial waste processing. Ways to solve waste problems and their recycling. Negative consequences of low level of recycling development. Factors and conditions for the development of recycling. Ecological consciousness of society.

2. *Waste classification and principles of waste management.* Principles of waste and by-products distribution. Waste classification. Wastes by field of reproduction. Waste according to the degree of danger and the nature of the impact on the environment and man-toxic, explosive, flammable, radioactive, etc. (hazardous waste); waste, depending on the state in which they are - gaseous, liquid, solid, mixed. Waste management. Stages of waste management assessment: waste prevention, reuse, recycling, energy resources, disposal (landfill).

3. *Methods of recycling.* Reuse of waste for its intended purpose. Return of waste to the production cycle. Mechanical recycling. Energy processing. Chemical processing.

*Literature: 1-16*

### **Lecture 4. Recycling as the only civilized method of disposal household waste**

1. *Consumer waste recycling.* Collections. Curb collection. Redemption centers. Landing centers. Distributed processing. Sorting of consumption waste.

2. *Industrial waste recycling.* Electronic waste recycling. Plastic recycling. Physical recycling. Chemical recycling. Waste of plastic pyrolysis to fuel oil.

3. *Economic assessment of the efficiency of the solid waste recycling process.* Sources of secondary resources. Solid waste. Criteria for the efficiency of the solid waste recycling process. Methods of evaluating effectiveness waste recycling technologies for the selection of innovation and investment projects according to their economic and environmental significance. Resource efficiency and pollution prevention. Economically effective resources consumption. Recycling efficiency index. Component assessments of the recycling process: economic, environmental and large-scale. Highly liquid, moderately liquid, poorly liquid and illiquid waste. Waste treatment efficiency indicator.

*Literature: 1-16*

## **Lecture 5. Sustainable development goals and an environmentally sustainable society**

1. *Global circular economy as a means of building a new environmentally sustainable society.* Landmarks of the circular economy in terms of countries. Global eco design. An integrated EU approach to the circular economy. Implementation of the EU Action Plan for the Circular Economy. Transition to circular thinking. Circular cost optimization.

2. *Decoupling analysis as a tool for achieving sustainable economic development.* The concept of "decoupling". The phenomenon of the gap between economic development and the degree of anthropogenic impact on the environment. Global environmental problems. Organization of economic cooperation and development. Resource decoupling. Economic growth. Use of resources. Decoupling by environmental factors. Impact decoupling. Pressure on the environment. Absolute and relative decapitation. Indicators of decoupling: macroeconomic and sectoral. The effect of decoupling. Deciphering index. Decoupling factor. Degrees of decoupling index. Expansive coupling. Recessive coupling. Weak decoupling, strong decoupling, recessive decoupling, expansive negative decoupling, strong negative decoupling, weak negative decoupling. Stages of decoupling analysis.

3. *Methods of providing the global decoupling.* Analysis of the EU action plan on the circular economy to form the institutional basis of national circular policies.

*Literature: 1-16*

## **Lecture 6. Recycling technologies and international waste trade**

1. *Waste recycling technologies.* Incineration at landfills. Plasma processing. Pyrolysis at low temperatures. Aerobic method of composting. The main stages of modern recycling technology: primary sorting, cleaning, rejection; distribution of waste to production strips; assembly of the final product; removal and disposal of waste at the landfill. Types of recycling system: mechanical, incineration, pyrolysis, chemical. Prospects for the life of secondary raw materials.

2. *International waste trade.* Comparative advantages of countries. Spatial-component structure of trade in waste and scrap. Formation of circular trade. Export and import of waste and scrap. Illegal waste trade. Trade flows of waste and scrap. Diversification of waste trade. Transboundary movements of hazardous wastes and their disposal (Basel Convention). Factors influencing the dynamics of circular trade. Prospects for international waste trade.

*Literature: 1-16*

## **Lecture 7. Features of recycling in Ukraine and foreign countries**

1. Problems and prospects of recycling in Ukraine.

2. Features of recycling in foreign countries.

*Literature: 1-16*

**4. THE STRUCTURE OF TEST CREDIT OF COURSE**  
**“Basics of circular economy”**

Course themes	Hours				
	Lectures	Practical classes	Self-studies of students	Training	Control measures
<i>Content module 1. Recycling basics</i>					
Theme 1. The global resource supply and resource consumption problems. Global economic and environmental risks	6	2	15	–	questioning
Theme 2. The circular economy basics: genesis, structure, peculiarities and the functioning principles	4	2	20	–	test
Theme 3. Recycling basics: the essence and methods	4	2	15	–	questioning
Theme 4. Recycling as the only civilized method of disposal household waste	6	2	15	1	questioning
<i>Content module 2. Recycling as a sustainable business model</i>					
Theme 5. Sustainable development goals and an environmentally sustainable society	4	2	15	–	questioning
Theme 6. Recycling technologies and international waste trade	4	2	15	–	test
Theme 7. Features of recycling in Ukraine and foreign countries	4	2	10	1	esse
<b>TOTAL</b>	<b>32</b>	<b>14</b>	<b>95</b>	<b>6</b>	



## 5. TOPICS OF PRACTICAL CLASSES

### *Practical class No 1*

#### **Theme 1: The global resource supply and resource consumption problems. Global economic and environmental risks**

**Purpose:** understanding the current world problems connected with rarity of natural economic resources and constant increase of consumption, the modern global economic and environmental risks and the ways of its overcoming.

**Discussion questions:**

1. Modern problems of resource consumption of the economies in the global economics conditions.
2. The problem of limited economic resources.
3. Modern global economic and environmental risks.

*Literature: 1-16*

### *Practical class No 2*

#### **Theme 2: The circular economy basics: genesis, structure, peculiarities and the functioning principles**

**Purpose:** understanding the essence of the circular economy and its role in providing rational consumption of limited economic resources, analysis of the circular economy models, its principles and toolkit; understanding the principles and features of the circular economy functioning.

**Discussion questions:**

1. The essence of the circular economy, the prerequisites for its formation and development.
2. The structure of the circular economy.
3. Models of circular economy.
4. Features and principles of the circular economy functioning.
5. Implementing the circular economy: goals, objectives and results.

*Literature: 1-16*

### *Practical class No 3*

#### **Theme 3: Recycling basics: the essence and methods**

**Purpose:** understanding the essence of recycling and features of its development all over the world; study of waste classification in order to provide effective waste management in the students' future professional activity.

**Discussion questions:**

1. The essence and historical principles of recycling development.
2. Waste classification and principles of waste management.
3. Methods of recycling.

*Literature: 1-16*

### *Practical class No 4*

#### **Theme 4: Recycling as the only civilized method of disposal household waste**

**Purpose:** understanding role of recycling in modern industry world as well as the essence of consumer and industrial waste recycling; providing students with knowledge of economic assessment of the waste recycling efficiency.

**Discussion questions:**

1. Consumer waste recycling.
2. Industrial waste recycling.
3. Economic assessment of the efficiency of the solid waste recycling process.

*Literature: 1-16*

#### ***Practical class No 5***

#### **Theme 5: Sustainable development goals and an environmentally sustainable society**

**Purpose:** understand the meaning of the sustainable society the ways to achieve it; be able to provide decoupling analysis in order to develop economic sustainability.

**Discussion questions:**

1. Global circular economy as a means of building a new environmentally sustainable society.
2. Decoupling analysis as a tool for achieving sustainable economic development.
3. Methods of providing the global decoupling.

*Literature: 1-16*

#### ***Practical class No 6***

#### **Theme 6: Recycling technologies and international waste trade**

**Purpose:** understand the essence of the waste recycling technologies and international waste trade in order to provide effective recycling policy.

**Discussion questions:**

1. Waste recycling technologies.
2. International waste trade.

*Literature: 1-16*

#### ***Practical class No 7***

#### **Theme 7: Features of recycling in Ukraine and foreign countries**

**Purpose:** analyze the recycling development features in Ukraine and other foreign countries; be able to make economic comparison of effective and ineffective recycling policies in different countries.

**Discussion questions:**

1. Problems and prospects of recycling in Ukraine.
2. Features of recycling in foreign countries.

*Literature: 1-16*

## **6.SELF-STUDY WORK**

<i>Nº</i>	<b>Topic</b>	<b>Number of hours</b>
1.	Circular economy in the context of alter globalization	3
2.	Products that last: product design for circular business models	3
3.	Mastering the circular economy: a practical approach to the circular business model transformation	4
4.	Circular economy: how to build a more resilient, competitive and sustainable business	4
5.	Alter globalization via expression of the inclusive circular economy paradigm	3
6.	Industry 4.0 and circular economy	4
7.	Regeneration of the built environment from a circular economy perspective	3
8.	A new dynamic effective business in a circular economy	3
9.	Business and environmental sustainability	3
10.	Advances in construction and demolition waste recycling: management, processing and environmental assessment	4
11.	Recycling economics: theories and practices of development	3
12.	The economic benefit of recycling	4
13.	How recycling improves the environment	3
14.	Recycling system for reusable cups	4
15.	Recycling and waste management in the modern era.	3
16.	Barriers for recycling: what stops the green economy development?	3
17.	Waste management impact from time management	4
18.	Recycling outlines health rates in society	3
19.	Friendship with nature through recycling	3
20.	Anti-plastic attitude as the most powerful tool of running business	4
21.	Should recycling be mandatory?	3
22.	The importance of recycling and landfills	4
23.	The ecology of recycling	3
24.	The financial benefits of recycling	4
25.	The economic benefits of recycling	4
26.	The effects of norm and policy incentives on household recycling	3
27.	Process intensification technologies for the green economy: engineering solutions for sustainable chemical processing	4
28.	Recycling in Europe: peculiarities and efficiency	4
29.	Recycling policy in the United States	4
30.	Recycling in Third World countries	4
	<b>Total</b>	<b>95</b>

## **7.Training course on discipline**

**Training course on discipline "Basics of circular economy"** is show the theoretical material referenced to reality and to develop their skills in the practical application of acquired knowledge in business planning.

*Task:* Developing a Circular Economy Strategy for a Local Business

*Objective:* Students, working in teams, are tasked with designing a circular economy strategy for a local business that currently operates under a linear model. The goal is to propose solutions that integrate circular economy principles into the business.

*Steps:*

*1. Business Description:*

Each team selects a type of business (e.g., clothing store, café, manufacturing company, etc.).

Provide a brief description of the current business model and operational processes.

*2. Problem Identification:*

Students should identify key stages in the business processes where resources are wasted (e.g., excessive raw material use, waste generation, high energy consumption).

*3. Solution Development:*

Propose at least three ideas to improve the business by applying circular economy principles, such as:

Product or material recovery.

Use of secondary resources.

Waste recycling.

Introduction of repair or rental services.

*4. Strategy Presentation:*

Each team presents their solutions to the other groups, justifying the advantages of their approaches. The presentation should include:

A brief analysis of the impact of their proposed solutions on the environment, economy, and society.

Expected outcomes from implementation (e.g., reduction in waste, resource savings).

*5. Evaluation:*

Other teams, together with the teacher, provide feedback and evaluate the presented strategies based on the following criteria:

Innovation of the proposed solutions.

Feasibility of implementation.

Potential benefits for the business and the community.

*Outcome:* By completing this task, students will gain a better understanding of circular economy principles and see how they can be applied in real-world situations to improve business sustainability and resource efficiency.

## **8. Assessment tools and methods for demonstrating the results of study**

In the process of study, the discipline “Basics of circular economy” the following methods of evaluation of students’ work are used:

- standard tests;
- current poll;
- modular testing and poll;
- scoring unit testing and interviews;
- presentations of results of students’ researches;
- modules control work;
- credit;
- other.

### 9. Criteria, forms of ongoing and final control

The final score (on a 100-point scale) the discipline "Basics of circular economy" is defined as a weighted average, depending on the proportion of each component of test credit.

Module 1		Module 2	Module 3
40%	40%	5%	15%
Current assessment	Modular control 1	Training	SSW
It is defined as the arithmetic average of the grades obtained during classes	1. Theoretical questions (2 questions) – max. 50 points. 2. Task (1 task) – max. 50 points.	Assessment for training tasks	It is defined as the arithmetic average of the grades obtained during the study of the discipline for self-study work (abstract, essay)

### Scale of marking:

For scale of TNEU	For national scale	For ESCT scale
90 – 100	Excellent	<b>A</b> (excellent)
85 – 89	Well	<b>B</b> (very well)
75 – 84		<b>C</b> (well)
65 – 74	Satisfactory	<b>D</b> (satisfactory)
60 – 64		<b>E</b> (adequately)
35 – 59	Unsatisfactory	<b>FX</b> (unsatisfactory with possibility of repeated passing)
1 – 34		<b>F</b> (unsatisfactory without possibility of repeated passing)

### 10. The list of visual materials and guidance

№	Description	Topic
1	Flipchart	1-7
2	Laptop	1-7
3	Projector	1-7
4	Package of presentation materials	1-7

## RECOMMENDED LITERATURE

1. The circular economy in detail. URL: <https://www.ellenmacarthurfoundation.org/the-circular-economy-in-detail-deep-dive>
2. Bakker, T. and Hollander, M. (2020). Products that Last: Product Design for Circular Business Models. BIS Publishers, 100 p.
3. Circule. URL: <https://circlesolutions.com/>
4. James, D. (2020). Secrets to Sustainable Living: On the Road to Zero Waste Lifestyle, from Recycling/Reusing, To Growing Your Own, Composting, and Even Backyard Homestead. Kindle Edition, 90 p.
5. Kristiansson, J. (2020). The Last Straw: Change Your Life and the Planet – for Good. Kindle Edition, 186 p.
6. Lacy, P. (2020). The Circular Economy Handbook: Realizing the Circular Advantage. Palgrave Macmillan, 350 p.
7. Liu, L, Ramakrishna, S. (2021). An Introduction to Circular Economy. Online: <https://link.springer.com/book/10.1007/978-981-15-8510-4>.
8. Mavropolous, A., Nilsen, A. (2020). Industry 4.0 and Circular Economy: Towards a Wasteless Future or a Wasteful Planet? John Wiley and Sons Ltd, 448 p.
9. Page, K. (2021). Mastering the Circular Economy: A Practical Approach to the Circular Business Model Transformation, 1<sup>st</sup> edition, 376 p.
10. Science, E. (2021). Circular Economy and Sustainability: Volume 1: Management and policy, 1408 p.
11. Weetman, C. (2020). A Circular Economy Handbook: How to Build a More Resilient, Competitive and Sustainable Business. Kogan Page Ltd, 496 p.
12. Zvarych I. Circular economy and global waste management. URL: [http://dspace.wunu.edu.ua/bitstream/316497/45141/1/%D0%9B%D0%B5%D0%BA%D1%86%D1%96%D1%97\\_%20Circular%20economy%20and%20global%20waste%20management.pdf](http://dspace.wunu.edu.ua/bitstream/316497/45141/1/%D0%9B%D0%B5%D0%BA%D1%86%D1%96%D1%97_%20Circular%20economy%20and%20global%20waste%20management.pdf)
13. Circular economy: definition, importance and benefits. URL: <https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits>
14. [http://dspace.wunu.edu.ua/bitstream/316497/45141/1/%D0%9B%D0%B5%D0%BA%D1%86%D1%96%D1%97\\_%20Circular%20economy%20and%20global%20waste%20management.pdf](http://dspace.wunu.edu.ua/bitstream/316497/45141/1/%D0%9B%D0%B5%D0%BA%D1%86%D1%96%D1%97_%20Circular%20economy%20and%20global%20waste%20management.pdf)
15. An Introduction to Circular Economy. URL: <https://link.springer.com/book/10.1007/978-981-15-8510-4>
16. Reference book on Circular Economy. URL: [https://www.researchgate.net/publication/375025055\\_Reference\\_book\\_on\\_Circular\\_Economy\\_for\\_teachers](https://www.researchgate.net/publication/375025055_Reference_book_on_Circular_Economy_for_teachers)