Syllabus

Course Title

Climate Change Mitigation and Adaptation: Case Studies and Best Practices (General Module)

General Information

General description of the required education/training, outlining the main objectives and explaining the necessity of the education/training at the organizational/country/regional level

The course "Climate Change Mitigation and Adaptation: Case Studies and Best Practices (General Module)" is one of the core components of the professional curriculum for the Master's program in "Climate Change Mitigation and Adaptation." The course will contribute to the development of analytical skills in the field of climate change adaptation and mitigation of its impacts across various sectors of the economy.

The main objective is to develop students' understanding of climate change processes, its causes and consequences, as well as to train them to design and apply strategies for mitigation (reducing greenhouse gas emissions) and adaptation (adjusting to already occurring climate changes).

Audience

The main target audience of the course and any secondary audience, if it may influence decisions regarding the structure or content of the course

Expected level of knowledge and skills of the main audience (current or minimally required), as well as other factors (for example, cultural characteristics, level of technical training, access to the Internet) that should be considered when planning the course, as they may affect the choice of teaching methods, materials, and approaches to interaction with the audience

The primary audience consists of master's students at higher education institutions in Ukraine who are studying in the field of climate services. The course may also be used, in part, as a professional development program for specialists in meteorology, climatology, and agrometeorology, as well as professionals in other fields where decision-making is based on climate information. It is also relevant for experts and civil servants working in environmental policy, law, or international cooperation, as well as for civil society activists and experts interested in developing adaptation strategies for various sectors of the economy.

Knowledge and Skills Requirements for the Target Audience

Fundamental Knowledge

To successfully complete the course "Climate Change Mitigation and Adaptation: Case Studies and Best Practices (General Module)," students should possess the following basic knowledge and skills:

Climate literacy, including a general understanding of climate change, its causes, and its impacts.

Integration of knowledge from ecology, economics, and management to

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assess impacts on natural and socio-economic systems.

Analytical Preparation

Analytical and research skills, including the ability to work with regulatory documents and international agreements.

Critical thinking and information analysis skills.

Technical Preparation

Participants should have basic computer and Internet skills and be familiar with tools used to access interactive learning platforms (e.g., Moodle). It is desirable that learners also have basic skills in data analysis, presentation development, and the use of analytical tools such as Excel.

English Language Proficiency

An intermediate level of English proficiency (B1 or higher) is recommended for working with international research, reports, and economic models.

Additional Factors

Inclusivity and Accessibility

The course will use a variety of content delivery methods, including text, audio, video, and interactive tasks. Learning materials will be provided in accessible formats such as large-print text, audio files, or files compatible with screen-reader software.

Learners will be given flexibility in choosing learning methods that best suit their needs.

Internet Access

The course includes online components; however, all materials will be available for download and offline use to accommodate potential limitations in Internet access.

Competencies

Training needs at the individual or organization/country/regional level, as well as a description of how these needs were identified and recognized as relevant.

Competencies targeted by the training.

C5. Based on economic assessments, provide action-oriented recommendations for the development and improvement of adaptation and mitigation strategies that enhance resilience and reduce negative impacts.

Learning outcomes and performance criteria

Learning outcomes and performance criteria formulated with regard to the knowledge and skills to be acquired during the training process.

Performance criteria:
Clearly formulate the impacts of climate change and related adaptation and mitigation strategies in written reports and oral presentations, using accurate data and real-world case study examples.
Learning Outcomes
LO1. Critically evaluate mitigation strategies relevant to specific sectors such as energy, transport, and agriculture by analyzing their potential to reduce greenhouse gas emissions and identifying implementation challenges.
LO2. Develop the ability to assess adaptation approaches aimed at supporting communities most affected by climate change, taking into account factors such as vulnerability, adaptive capacity, and climate justice.
LO5. Examine real-world examples of successful climate change mitigation and adaptation initiatives, identifying key lessons and best practices that can be applied in relevant contexts.

Course Content

Provide a content outline that corresponds to the learning objectives and outcomes. This may be a course outline as it will be presented to students, but not necessarily a complete curriculum.

Include a general list of all topics that you consider necessary to cover. If you believe it would help clarify the scope, indicate what will NOT be covered.

Module 1: Assessment of Climate Change Mitigation Strategies in the Economic Sector
Critically evaluate mitigation strategies that correspond to specific sectors such as energy, transport, or agriculture, analyzing their potential to reduce greenhouse gas emissions and the challenges of implementation.
Part 1. Current state of knowledge on climate change
Part 2. Evolution of global efforts to combat climate change
Part 3. Comprehensive analysis of climate change mitigation strategies
Module 2: Assessment of Adaptation Measures for Vulnerable Communities
Develop the ability to assess adaptation approaches aimed at supporting communities most affected by climate change, taking into account factors such as vulnerability, adaptability, and climate justice.
Part 1. The aspect of justice in the context of climate change. The link between social vulnerability and vulnerability to climate change
Part 2. Sustainable development and social justice as a foundation for effective environmental policy
Module 3: Synthesis of Best Practices from Situational Analysis
Part 1. Green economy concepts as a progressive development model
Part 2. Contribution of bioenergy to end-use sectors: electricity, transport, and heat supply

Learning Solutions and Methods of Implementation

List the learning solutions (teaching methods) that will be used and explain why they were chosen. For example: classroom learning, online learning, blended learning, workplace learning, online resources for self-study, coaching or mentoring, etc.

For master's students, a blended learning approach is preferable whenever possible. Based on practical considerations, it can be concluded that in such a format, online learning makes it significantly easier for this group to manage their study time independently. Considering their educational needs, it can be assumed that master's students are ready for online learning, as they already possess well-developed self-directed learning skills, time management abilities, and a high level of motivation.

However, since the intended learning outcomes are complex and multifaceted, it is desirable that online learning be complemented by the direct consolidation of knowledge through practical activities, which is best achieved in an offline setting.

Master's students are expected to meet with the instructor one to two times per week in person to discuss knowledge acquired through video lectures and other materials, and to reinforce and refine their skills and competencies. The online component, which will take place mainly in an asynchronous format, will be monitored by the instructor through discussion forums, allowing for more in-depth engagement with questions arising during the learning process.

At the end of the course, a summative assessment of learning outcomes will be conducted.

Given the current challenging conditions in Ukraine, master's student groups may also be offered asynchronous online learning with the possibility of synchronous sessions.

In the case of online learning, students' educational needs can, in some respects, be addressed more effectively than in offline formats, as it allows for the involvement of a larger number of experts in relevant fields who might otherwise be unavailable due to workload constraints, which can positively influence learning effectiveness.

In this context, it is very important to ensure the possibility of frequent and purposeful communication between the instructor and master's students, as a deep understanding of various dimensions of the issues that arise (climatic, economic, etc.) is required. This can only be achieved through close and continuous interaction.

Learning Strategies

Consider which learning strategies you will use. Provide justification for why you intend to apply them, including reasons why they will help participants achieve the planned learning outcomes.

Combine different learning strategies to create a diverse learning environment that accommodates different learning styles of participants. This will increase the effectiveness of learning and help achieve the planned learning outcomes. This section does not require a detailed description of specific activities.

The following teaching strategies are planned during the course.

The discussion strategy will enable learners to develop practical experience in jointly discussing and solving theoretical and practical problems.

The situational analysis strategy is an important element in the preparation of future climate managers.

Since the course covers both theoretical and practical aspects of climate law, the teaching strategies should ensure a balance between knowledge acquisition, analytical thinking, and the practical application of the material.

1. Active Learning and Case Analysis

Methods:

1. Analysis of key legislative documents that form the foundation for limiting greenhouse gas emissions and mitigating global warming (United Nations Framework Convention on Climate Change, Kyoto Protocol, and Paris Agreement).
2. Analysis of three main approaches to climate change mitigation (traditional technologies, negative emissions technologies, and radiative forcing geoengineering technologies).
3. Discussions on the effectiveness of traditional and non-traditional mitigation approaches.

Expected outcome: Development of critical thinking and legal analysis skills.

2. Project-Based Learning

Methods:

1. Group work on projects simulating real climate challenges (e.g., assessing the impact of climate change on specific economic sectors and developing adaptation measures).
2. Preparation of model legal documents (recommendations, policies, memoranda).
3. Presentation of results and discussion of their effectiveness.

Expected outcome: Application of knowledge in practical scenarios, development of teamwork and analytical skills.

3. Discussion Clubs and Debates

Methods:

1. Organizing debates on topics such as: “Which mitigation approaches are more effective – traditional or emerging ones?” or “How can the most climate-vulnerable communities be identified?”
2. Discussion of international approaches to climate adaptation strategies.

Expected outcome: Development of argumentation skills, ability to defend a position, and formation of an independent perspective on the issue.

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Learning Activities

Describe the main learning activities that will be included, such as lectures, readings, case studies, discussions, exercises, practical assignments, simulations, role-playing games, etc.

Also describe the roles of instructors and students during these activities.

The course includes lectures and practical classes (33% of the total course hours) as well as independent student work (67% of the total course hours). For each module, 10 academic hours are allocated to contact sessions, while 20 hours are dedicated to independent student work. Thus, contact hours consist of 1–3 lectures and practical sessions, with the remaining time allocated accordingly.

The main organizational form of instruction is the lecture, which serves as the starting point for studying the course. From the first lecture, students are introduced to the instructors, the aims and structure of the course; the connection between the theoretical content and practical tasks is explained; a list of educational and scientific sources is provided; and the conditions for continuous and final assessment are communicated.

Requirements for lectures

Lectures must be:

- scientifically grounded and informative;
- well-supported with sufficient scientific evidence, facts, documents, and illustrative examples;
- designed to activate students' thinking by including questions for reflection;
- clearly structured with a logical progression of material;
- methodologically refined, including explanations of new terminology, highlighting of key ideas, statements, and conclusions, and repetition of conclusions in different formulations.

The final lecture provides a brief overview of the studied material and systematizes knowledge, with mandatory clarification of the most complex examination questions.

The learning process also includes practical classes, which enable deeper study of the course and play an important role in developing students' ability to apply theoretical knowledge in solving practical tasks. Practical classes allow the instructor to develop and monitor students' mastery of the course material. They may be implemented in the form of assignments, exercises, case studies, and activities aimed at developing teamwork skills through research and analysis of results.

Independent student work is a significant component of the learning process. The effectiveness of classroom learning depends on students' self-preparation. Effective independent work requires planning and instructor supervision, as well as allocation within the curriculum.

Independent work is carried out not only to master the course content, but also to develop the ability to work independently in academic, scientific, and professional contexts, as well as to foster responsibility, problem-solving skills, and the ability to

find constructive solutions in crisis situations.

It includes preparation for lectures, practical classes, and assessment activities, as well as completion of part of the practical assignments.

The role of the instructor in lectures is to ensure overall control of the learning process and to select appropriate teaching methods and strategies. During practical classes, the instructor acts as an instructor or supervisor, guiding the direction of practical tasks. Throughout the course, the instructor provides support to students through scheduled and unscheduled consultations.

The role of the student is to acquire knowledge, skills, and competencies in practical activity and teamwork through tasks assigned by the instructor, thereby preparing for their future professional career.

Assessment of Learning

Describe the assessment plan for participants before, during, and/or after the course, including tests, exercises, activities, and projects that will be assessed. Indicate whether self-assessment or peer assessment will be used.

Explain how the assessment is linked to the learning outcomes.

For monitoring students' knowledge, a module-based assessment system is used. The system is based on dividing the course into separate, logically connected units—modules. The overall assessment of students' theoretical knowledge and practical skills consists of the results obtained for each module (3 theoretical modules with a maximum of 20 points each, and 3 practical modules: 20 points for the first module and 10 points for the second and third modules).

The final integrated grade includes scores from each module, reflecting the importance of each module in mastering core knowledge and skills, as well as students' consistency in completing assessment activities within the deadlines set by the curriculum.

Testing is conducted in a fully online format via the distance learning platform. It allows the instructor to assess the level of students' mastery of theoretical material. Each theoretical test consists of 20 questions. The grading scale is as follows: 50–74% correct answers correspond to a satisfactory (minimum) level, 75–89% to a good level, and 90–100% to an excellent level of mastery.

Practical classes are conducted under the supervision of the instructor during contact hours, the number of which is defined in the syllabus. The tasks and supporting materials for practical assignments are provided on the distance learning platform. Completed assignments are uploaded by students to the platform for evaluation and feedback from the instructor.

Properly completed practical assignments are assessed according to the achievement of learning outcomes and the quality of work. The evaluation criteria are as follows:

- Excellent level – the student completes all tasks independently (80% of the total score for the practical work), presents results in a presentation

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format (20%), and answers the instructor's questions during the presentation.
- Good level – the student completes all tasks independently without presenting a presentation (80% of the total score).
- Satisfactory level – the student completes all tasks with the instructor's assistance (60% of the total score).

The final course grade is calculated as the arithmetic sum of points from all current modules during the semester (theoretical modules and practical assignments), i.e., the cumulative score accumulated throughout the semester. The maximum possible score for the course is 100 points.

Storyboard of Learning (Learning Storyboard)

Use this to create a visual scenario of your blended learning activity

Acquisition

Learning through acquisition refers to what master's students do when they attend lectures or listen to podcasts, read books or websites, and watch demonstrations or video materials:

- reading books and articles (reading digital books, articles, multimedia content, websites, documents, and other resources);
- listening to presentations and lectures (including podcasts and web broadcasts);
- watching demonstrations and masterclasses (including animations, videos, demonstrations, and workshops);
- participation in question-and-answer forums.

Learning resources and tools

List the available resources that will be used for different types of learning activities and recommended to students.

Describe the technologies that will be used to implement learning solutions, including educational technologies and operational equipment (hardware, software, collaboration tools).

1. Access to learning materials – video lectures, presentations, and additional informational materials will be uploaded to the Moodle platform, allowing students to review the content before lectures and practical classes.
2. Access to online resources – students will have the opportunity to use open and specialized online information resources, including databases, scientific articles, and analytical reports.
3. Online lectures and communication – lectures and interactive sessions will be conducted via Zoom, enabling real-time communication with the instructor,

participation in discussions, and teamwork on projects.

4. Presentation materials – learning content will be delivered in PowerPoint presentation format, which will help students systematically absorb information and use it for preparing their own presentations and projects.
5. Additional tools – the learning process may include interactive platforms for testing, data analysis, and modeling, which will support the practical acquisition of knowledge and skills.

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