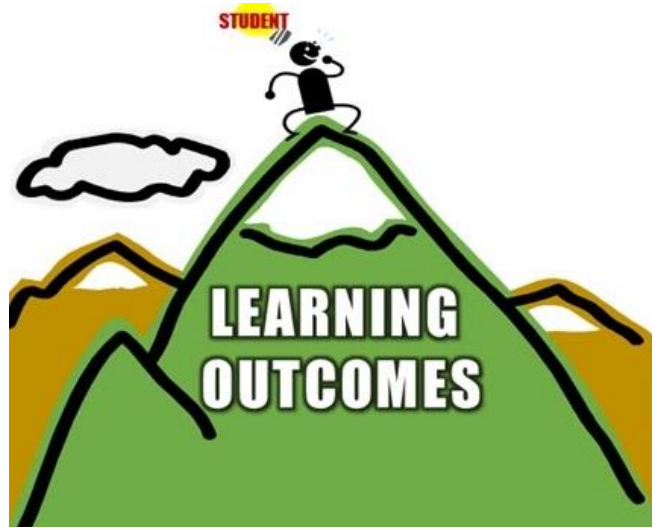
Supplementary Materials

Learning Outcomes (LOs) –

VE Weeks in **CLUVEX**

VE Weeks in **UnaVEx**

ClimEd Trainings



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VE Week – Learning Outcomes /in Certificate/
CLUVEX / UNAVEX

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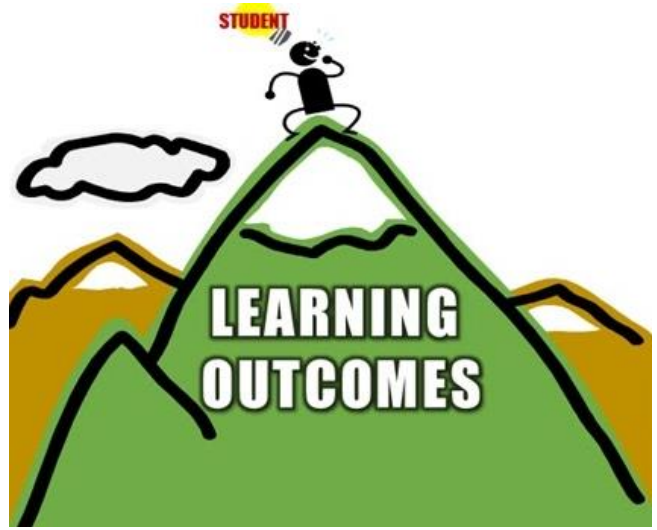
- Basics of the atmosphere, biosphere, hydrosphere and anthroposphere interaction and feedbacks.
- Basics of climate change based on latest science: Planetary boundaries concept, Last methodological tools used in observing the Earth System.
- Understanding of the human role from different perspectives like ethical, social, different cultural backgrounds in climate change, adaptation, and mitigation advances.
- Critically reflect owns views on climate change, sustainability, and create new visions.
- Reflect different international and intercultural perspectives on climate change and sustainability.



- Reflect about global versus local challenges in finding adaptation and mitigation solutions.
- Work together in different online working environments.
- Work and be part of an international teams and manage small joint projects.
- Communicate and present their work in English.
- Learning basic study skills such as use of open data, literature search, critical reading and thinking.

Trainings – Learning Outcomes /in Certificates/

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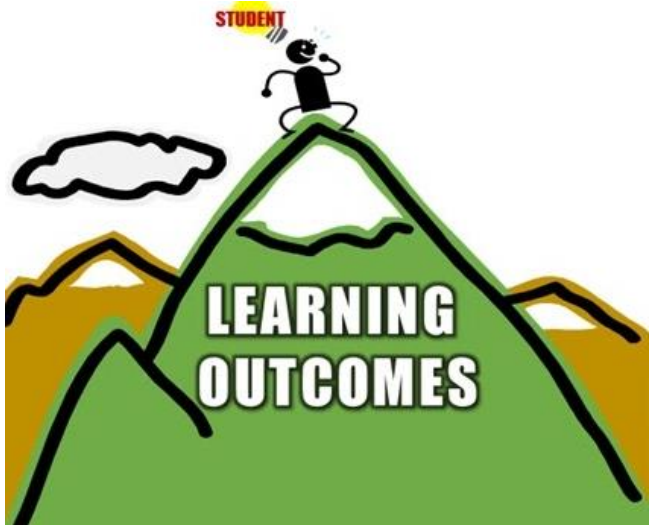
ClimEd Tr #1 (10 LOs): Competency-based Approach to Curriculum Development for Climate Education

1. Explain European and national qualification frameworks
2. Characterize Bloom's taxonomy
3. Formulate learning outcomes at the programme and course levels
4. List and explain main steps of curriculum design
5. Reflect on external constraints influencing curriculum design
6. Describe the concept of constructive alignment
7. Describe active methods of teaching and learning
8. Provide examples of good and bad practice for student centered learning
9. Propose adequate teaching and learning methods for various types of classes
10. Awareness of psychological factors linked with assessment



ClimEd Tr #2 (5 LOs): Adaptation of the Competency Framework for Climate Services to conditions of Ukraine

1. Explain basic principles of the development and scope of competencies and qualifications frameworks, including stages and requirements in elaboration and implementation of a competencies framework
2. Formulate competence-based education principles and practices and identify teaching and learning methods, topologies and assessment tools for measuring competencies' development
3. Define appropriate competences from competence framework for the implementation into curricula and reference learning outcomes to national qualification framework levels
4. Identify WMO competencies framework and its potential usage, stages in climate services development, including linking them to university-level training experiences
5. Build a logically interconnected system of the sustainable educational program core components and curricula content taking into account processes and practices and allowing to achieve program's goals and learning outcomes in the specialty (Earth Sciences disciplines)

Trainings – Learning Outcomes /in Certificates/

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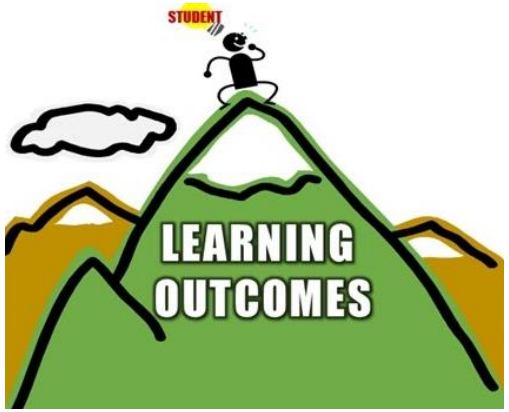
ClimEd Tr #3 (12 LOs): Digital Tools and Datasets for Climate Change Education

Basic knowledge of

1. regional focus of IPCC Assessment Report in Ukraine context
2. activities in support climate related research in Ukraine
3. WMO mechanisms and entities for provision of operational seasonal forecasts, current limitations of WMO regional clim. outlook forums and reasons to expand portfolio of clim. products, key features of objective seasonal forecasts
4. existing types, specifications and challenges of meteorological/climate observation systems
5. main principles, instruments, satellite Earth Observations products
6. Earth System Modelling, basic information of CMIP6 and its datasets
7. needs, use and advantages of regional climate models for local/regional impact studies
8. urban integrated system approach, principle modeling strategies at fine spatial resolution in ABL
9. datasets at Copernicus Climate Change Service (C3S) Climate Data Store (CDS)
10. Understanding possibilities of C3S CDS Toolbox in climate data visualisation and analysis
11. Skills in usage of C3S CDS Toolbox for group projects (as small-scale research projects)
12. Skills in group's (as the team) developing and realizing research plan, and presenting research project results.



ClimEd Tr #4 (7 LOs): Developing Learning Courses in Climate Services Considering Needs of Different Users

1. Assess the location and characteristics of observation sites vs requirements for climate observation reference network
2. Apply quality control processes to climate data and resulting time-series
3. Identify and retrieve climate data from different sources to generate climate products
4. Compute basic climate products, normals, and averages, or anomalies defined in relation to a reference period
5. Compute climate indices for the monitoring of climate change, climate variability and climate extremes
6. Compute sector-specific climate indices and other sector-oriented climate products
7. Create value-added products, such as graphics, maps and reports to explain climate characteristics and evolution, according to the needs of specific sectors such as health, agriculture, water, energy and disaster management

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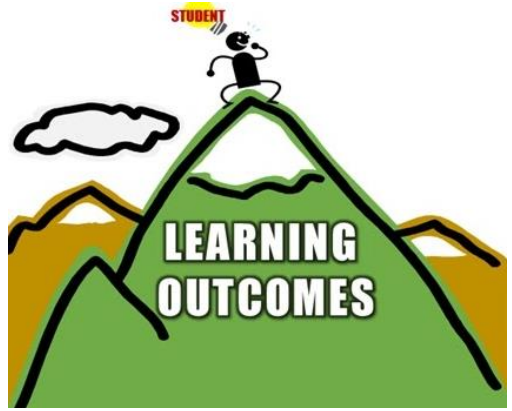
ClimEd Tr #5 (5 LOs): Applying Different Technologies of Blended/Online Learning in Education

1. Integrate emerging technologies into climate education by understanding their impact on policy and educational practices
2. Mastery of tools like Moodle for online exam design and assessment
3. Development of online modules for climate education, focusing on strategies for advancing education
4. Planning and preparation of blended learning modules for climate topics
5. Application of advanced techniques in Moodle for interactive online climate education



ClimEd Tr #6 (6 LOs): Mastering Technologies of MOOCs Development for General Public

1. Understanding of what a MOOC (Massive Open Online Course) is and how it differs from a traditional e-course.
2. The ability to design the MOOC development process, from idea generation to course implementation.
3. The ability to apply techniques for developing MOOCs using platforms like Moodle and Canvas.
4. The ability to create and present learning materials and interactive content using H5P.
5. The ability to use assessment and feedback tools for MOOCs.
6. Presented their group work, which involves creating a micro-course for a MOOC.

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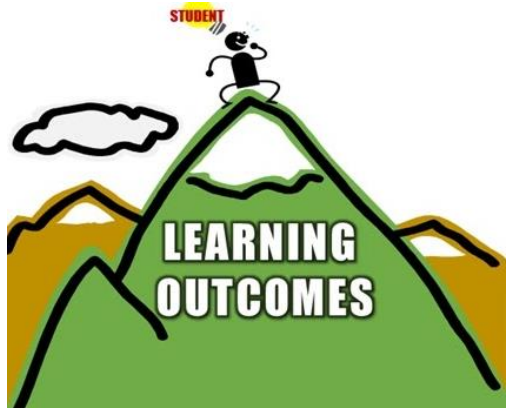
ClimEd Tr #7 (9 LOs): Developing Skills to Use Climatic Information and Services for Various Climate-Dependent Branches of Economy



1. Identifying and selecting the most appropriate online sources of climate related data
2. Downloading, quality checking and preparing climate related data in required formats
3. Computing core climate indices, interpreting results in context of specific location
4. Understanding sectorial climate information needs and defining sectorial indicators
5. Identifying key climate-sensitive decisions within a selected sector of economy
6. Selecting climate variables and thresholds to sector's decision-making processes
7. Formulating and justifying climate indicators tailored to support decisions
8. Building basic functionalities (incl. input/ visualization/ output) of Shiny App to show climate information and sectorial indices
9. Integrating climate relevant information and indicators into Shiny App to explore and interpret data for supporting informed decision-making

Tr #1 (10 LOs): Competency-based approach to curriculum development for climate education
Tr #2 (5 LOs): Adaptation of the competency framework for climate services to conditions of UA
Tr #3 (12 LOs): Digital tools and datasets for climate change education
Tr #4 (7 LOs): Developing learning courses in climate services considering needs of different users
Tr #5 (5 LOs): Applying different technologies of blended/online learning in education
Tr #6 (6 LOs): Mastering technologies of MOOCs development for general public
Tr #7 (9 LOs): Developing skills to use climatic information and services for various climate-dependent branches of economy