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COMPETENCE-BASED APPROACH TO CURRICULUM DEVELOPMENT FOR CLIMATE EDUCATION

CLIMED TRAINING 1 (ONLINE)

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Module 1 - 2 ECTS credits (60 hours) - EQF for LLL - level 4
National level 4

Global climate change and public health

Learning Outcomes

1. Identify the main causes of global climate change
2. Analyze anthropogenic impacts on climate and the adaptation/mitigation measures in various economic sectors
3. Analyze the relationship between climate change and key negative health effects
4. Interpret short-term weather forecasts in order to identify dangerous meteorological phenomena and natural disasters

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Module 1, Learning Outcomes

5. Reproduce algorithms for providing first (pre-medical) aid to victims under extreme weather conditions and natural disasters
6. Discuss about global climate change and key health complications
7. To inform the general public about the impacts of climate change on human health in a way of popularizing health-related knowledge, aiming at global awareness rising to adaptation and mitigation measures

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Module 1
Content Scope

Climate change is an existential threat to all of the humanity. In particular, the climate crisis poses an imminent threat to the health of the elderly and senile population, with comorbid pathology, children and pregnant women, as well as the fetus development and reproductive health. Therefore, the development of trans-disciplinary courses is necessary to educate the general public, in order to raise people's global awareness towards taking measures to mitigate the effects of climate change and reduce complications, as well as to prepare and inform the people about the algorithms of first (pre-medical) aid under conditions of natural disasters and abnormal weather

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Module 1, Content Scope

Key Topics:

1. Climatic factors, environmental pollution, nutrition, lifestyle and human health: establishing relationships
2. Global climate change: causes and consequences for the humanity
3. Climate-dependent sectors of the economy and climate-vulnerable groups of the population: adaptation strategies
4. Algorithms for providing first (pre-medical) aid to victims of abnormal climatic events and natural disasters

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Module 1
Teaching and learning methods

Classroom lectures, online learning, blended learning, online self-study resources. Module is designed for 2 ECTS credits and is 60 academic hours by duration,
of which lectures call for 6 hours,

practical lessons – for 16,

and self-directed learning – for 38 hours

Learning strategy combines online and offline learning

Teaching methods: lectures (video-lectures), (virtual) classroom presentations, self-directed learning with exploration of recommended literary sources and electronic media, group and individual discussions, tests

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Module 1, Learning Assessment

Before the module taking, a sort of pre-training assessment and self-evaluation of learners is scheduled in a form of a test or questionnaire in order to reveal initial knowledge on the module's topic

During the study - completing assessment assignments (mini-essay, report-presentation from individual and/or group activities)

At the end of the study - test control

The mark **"excellent"** is given to the listener, who systematically worked during this course, demonstrated a diverse and deep knowledge of the program material, and successfully fulfilled the tasks provided for by the learning program, having demonstrated good comprehension of the basic and additional literature recommended by the teachers. The competence level: high (creative)

Module 1, Learning Assessment

The mark **"good"** is given to the listener, who has demonstrated complete knowledge of the program material, successfully completed the tasks provided for by the learning program, has mastered the basic literature recommended by the teachers, showed a sufficient level of knowledge of the module's topics and has been capable of independent learning in the course of further education. The competence level: sufficient (constructive and variable)

The mark **"satisfactory"** is given to the listener, who has demonstrated sufficient knowledge of the basic program material, coped with the tasks provided for by the learning program, however made some mistakes while completing the tasks; anywhere, the listener demonstrates the necessary level of knowledge and understanding to work out the mistakes under the guidance of the teacher. The competence level: medium (reproductive)

The mark **"unsatisfactory"** is given to the listener who did not show sufficient knowledge of the basic educational and program material, made fundamental mistakes in performed tasks provided for by the learning program, has not been able to use the knowledge in further training without the aid from the teacher, and could not master the skills of independent work. The level of competence is low (receptive-productive). It is recommended to re-study the module

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Module 2 - 2 ECTS credits (60 academic hours) – EQF for LLL - level - 8, National level - 8, FQ EHEA - Third cycle

Managing population health risks associated with air pollution in urban areas

Learning Outcomes

After completion of the training, participants will be able to:

1. Explain the relationships between climate change, air quality and the population health in urban areas, as well as effects of major atmospheric pollutants on inhabitants of mega-cities
2. Independently choose and apply appropriate methods for analysis of environmental risks to the population health from atmospheric pollution exposure
3. Evaluate damaging effects of PM2.5 and ozone (O3) on human health, in particular, on obstetric outcomes like preterm birth and low body mass at birth, and on the COVID-19-infected patients, as well
4. Justify priorities of the 'climate-neutral cities' policy, "zero-emissions" in metropolitan areas, implementation of transport and other urban engineering infrastructure with a lower carbon footprint, the chemicals evaluation and labeling system, with respect to the REACH and CLP regulations

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Module 2, Learning Outcomes

5. Establish relations between atmospheric pollution by nitrogen dioxide (NO2) and deaths accidence caused by the COVID-19
6. Reason possible effects of subfertility, epigenetics and congenital fetus malformations at inhalation of or transdermal contacts with synthetic chemicals
7. Evaluate modern approaches and techniques of nature-based and “green” solutions in construction for improvements of environmental quality of the urban systems and reducing levels of environmental risks to the population health
8. Recommend proper legal and institutional tools to prevent, reduce and control industrial atmospheric pollution and risks of industrial accidents

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Module 2
Content Scope

The module is designed for PhD programs in Environmental Health or for further education and training of construction engineers and health care professionals. Its main focus is on the scientific backgrounds and modern challenges of the urban environment's impacts on the climate-dependent economy sectors of construction and health care

The module aims at development of trainees' understanding of relations between the urban environmental quality and population health, critical application of environmental risks analysis techniques, and capability to make independent and informed decisions on implementing known and actual measures to prevent or mitigate deteriorating environmental health effects caused by urban atmospheric pollution

Assessment of the quality of urban atmospheric environment and forecasting environmental risks to the population health at various building options and air pollution indexes are placed in a core of the module. The methods of environmental risks analysis and control are described, with particular attention to the health effects of urban atmospheric pollution. Engineering, institutional and organizational "green" solutions to improve urban air quality and population health are discussed, too

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Module 2, Content Scope

However, this module does not deal with analysis and management of the population health risks associated with urban soil and aquatic pollution that could be the topics of another module

Key topics of the module are:

1. Methods of analyzing environmental risks, caused by atmospheric pollution, to the population health, basing on the air quality monitoring data
2. Microclimate-modified impacts of air pollution on population health
3. Implementation of the “green building” approaches and techniques to prevention and/or mitigation of deteriorating effects of atmospheric pollution on the population health

Module 2
Teaching and learning methods

The modes of training are either solely online learning or combination of classroom activities with online learning (blended learning), depending on actual restrictions posed by epidemiological situation in the country. These modes of training are accompanied with online resources for self-directed learning and mentoring/tutorial activities, as well

The learning strategy implies combination of classroom or online lectures and instructions (37% of total study hours) with trainees' self-directed independent learning (63%). Workload is distributed as follows: lectures – 6 academic hours; practical classes and seminars – 16 hours; independent studies – 38 hours. Such ratio of the teacher-controlled to self-controlled studies allows trainees, from one hand, to get necessary instructions and advices from teachers, and, from another hand, to get better prepared to classroom discussions, presentations of individual assignments and tests

The learning methods includes key-note lectures or video-lectures (supporting achievement of the learning outcomes (LOs) 1, 4, 7, and 8), practical classes (LOs 1, 4, 5, 6, and 7), seminars (LOs 4, 7, and 8), clinical reviews (LOs 3 and 6), case studies (LOs 2, 3, and 8), reading and online resources reviews as self-directed learning (LOs 1-8), group discussions (LOs 2, 3, 4, 6, 7, and 8), tutorials/mentoring (LOs 1-4, 6-8), testing assignments (LOs 1, 3, 6, 7, and 8)

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Module 2, Teaching and learning methods

During the classroom or teacher-led online activities the teachers do not only provide for unidirectional information flow but act rather as facilitators of classroom discussions on key topics of the module. They stress on modern challenges imposed by climate change and environmental pollution on the population health, outline basic principles of environmental hazards and risks assessment, recommend substantial reading sources and encourage learners to search for additional ones. Teachers should be ready to manifestation of either high enthusiasm or reluctance of learners to the module coverage, and to respond flexibly to students' enquiries during classroom activities, as well as individual and group consultations. The learners, from their side, are expected to provide a feedback to teachers concerning the scope of the module, teaching and learning approaches. They ask questions during the lectures, practical classes, propose the topics for group discussions and their individual writing assignments, however being consistent with the module's scope. While showing their autonomy the learners are expected to show responsibility, self-discipline and time-management skills, as well

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Module 2
Learning Assessment

During the training, the following elements of trainees' performance are assessed:

- Correctness of the answers to the questions and adherence to time frames of testing assignments (3 mini-tests after addressing each of key topics), linked to LOs 1, 3, 6, 7, and 8
- Critical understanding of recommended by the teacher and found independent lyiterature sources, writing consistency, logics, graphic display and grammar of the written review (1 review per module, up to 10 A4 pages by length), linked to LOs
- Level of reasoning, logicality and adherence to ethical norms during group discussions and presentations (minimum requirements is to participate in at least 1 of 3 group discussions organized during the training)
- Practical skills at exercises on the 'phantoms' to test LOs

Module 2, Learning Assessment

After completion of the training learners should pass final testing assignment (LOs 1-8). Under restrictions posed by the COVID-19 pandemic final testing control is carried out in a synchronous online mode, with time frames applied

The learner's performance is assessed as **"excellent"** (grade "Excellent") when (s)he has systematically worked during the training, shown diverse and deep knowledge and understanding of the program materials, including recommended and additional reading resources, successfully completed all module's assignments, and correctly answered more than 90% of final test's questions. Such learner demonstrates multidisciplinary knowledge, communicativeness, creativity and ability to further professional development
The competence level is assessed as high (creative)

Module 2, Learning Assessment

The learner's performance is assessed as **"typical"** (grade "Good") when (s)he has systematically worked during the training, shown full knowledge of the module's materials and good understanding of the recommended reading resources, successfully completed all module's assignments, and correctly answered 80 to 89% of final test's questions. Such learner demonstrates sufficient knowledge, communicativeness, and ability to self-directed learning during further professional activities. The competence level is assessed as sufficient (constructively-variable)

The learner's performance is assessed as **"threshold"** (grade "Satisfactory") when (s)he has shown the knowledge and understanding of the basic program materials, including recommended reading resources, to the level sufficient for further professional activities, completed the most of or all module's assignments with some errors, and correctly answered 70% to 79% of final test's questions. Such learner demonstrates the level of knowledge and communicativeness necessary to perform errors correction under teacher's supervision. The competence level is assessed as medium (reproductive)

The learner's performance is assessed as **"failed"** (grade "Unsatisfactory") when (s)he has not shown sufficient knowledge and understanding of the basic program materials, including recommended reading resources, and made principal errors while completing the most of module's assignments, and failed the final test with the number of correct answers less than 70%. Such learner cannot independently apply the knowledge during further learning without teacher's supervision. The competence level is assessed as low (receptive-productive).
In such a case, re-study of the module is recommended

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ClimEd

Module 3 - 2 ECTS credits (60 academic hours) - EQF for LLL - level - 8
National level - 8
FQ EHEA - Third cycle

Post-diploma Training Programme for Health Care Professionals

Climate resilience and adaptation for the health-care sector

Learning Outcomes

1. Summarize data on a probable climate change depending on climate scenarios
2. Determine local factors that aggravate human maladjustment to the climate change
3. Analyze climate risks for public health and their relationship to the global climate change
4. Identify the most vulnerable groups within the population under the climate crisis
5. Explain to a new target audience the links between the atmosphere, the global climate and the wider pathogenic microorganisms, fungi, the protozoa, and allergens

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ClimEd

Module 3, Learning Outcomes

6. Summarize the adverse perinatal and pediatric consequences of the climate change and its economic implications
7. To draw conclusions about impact of the climate change on cardiovascular disease, subfertility, mental health
8. To prescribe measures aimed at prevention of premature birth, fetal growth retardation under the conditions of a heat wave and heat stress
9. Summarize the main directions of solving the problem of population security conditioned by the climate crisis

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Module 3
Content Scope

Summarize the main directions for solving the problem of population security caused by the climate crisis. Global warming, gradual warming of the Earth's surface, oceans and atmosphere, conditioned by human activities, primarily burning of fossil fuels, which releases carbon dioxide (CO2), methane and other greenhouse gases into the atmosphere, is becoming a real challenge to humanity

These changes are accompanied by storms, even paradoxical snowstorms, abnormal temperature rise, ice melting, sea level changes, natural disasters and deteriorating air quality. Discussions about air quality, heat exposure, and even population displacement are integral to the climate crisis. Adverse obstetric outcomes due to extreme weather conditions (primarily heat and natural disasters) and air pollutants (mainly fine particulate matter (PM2.5) and ozone) include premature birth, low birth weight and stillbirth

Module 3, Content Scope

Direct reproductive losses from miscarriage of various etiologies each year amount to 36-40 thousand unborn desired children. Over 30-40% cases of perinatal pathology and mortality are associated or caused by premature birth. Every year, the number of children with low and extremely low birth weight is increasing, and the mortality rate in this category is 33 times higher than among full-term babies. Premature birth is associated with significant economic costs. Thus, according to international data, the cost of nursing premature infants can account for up to a third of health-care costs in general and up to a tenth of the total cost of medical care for children (ACOG, 2003)

A study on evaluation of economic losses associated with prematurity (Petrou et al., 2003) calculated the total cost of inpatient care services for 239,694 children under 5 years of age, as well as their dependence on gestational age at birth. It turned out that premature babies, born before the 31st week of gestation, received more expensive treatment compared to babies born on time. In addition, it has been shown that the economic costs of transporting a premature infant to a specialized medical institution increase 5-42 times (Respondek-Liberska et al., 2004). Nursing and treating babies born at 29 weeks of gestation is 100 times more expensive than babies born at 38 weeks of gestation

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Module 3, Content Scope

Therefore, training specialists who can mitigate vulnerability of the population under the new climatic conditions, develop measures for adaptation to emerging climate changes in various climate-dependent areas of the economy, based on a transdisciplinary approach, will bring real economic benefits to the society

Key topics of the course:

1. Scenarios of the climate change on a global, regional, local scale; their interpretation in terms of vulnerability of various populations and health care in general
2. Assessment of health risks associated with climate change and interfacing processes of air pollution and the spread of pathogenic biological agents
3. Climate risks and risks of development of neoplasms, pathology of the cardiovascular, nervous, reproductive systems of the human body
4. Problems of safety and adaptation of the population to global climatic changes, abnormal temperature and natural disasters

Module 3
Teaching and learning methods

Classroom lectures, online learning, blended learning, online resources for self-studies. Designed for two credits: 10 - lectures, 20 - practical classes, 30 - independent work

Learning strategies: online and offline, blended learning

The learning methods: lectures, clinical conferences, seminars, workshops, clinical reviews, clinical rounds, test control, individual and group discussions (assignments)

The learning methods includes key-note lectures or video-lectures (supporting achievement of the Learning Outcomes (LOs) 1, 5, 7, and 8), practical classes (LOs 3, 4, 6, 7, and 8), seminars (LOs 6 and 9), clinical reviews (LOs 6, 7 and 8), case studies (LOs 6, 7, and 8), reading and online resources reviews as self-directed learning (LOs 1-9), group discussions (LOs 6 and 9), tutorials/mentoring (LOs 7 and 8), testing assignments (LOs 3, 4, 5, 6, and 8)

Module 3
Learning Assessment

Assessment:

- Taking test task
- Solving situational tasks
- Doing individual and group assignments (discussions)
- Practical skills with practice on phantoms

Test control under the conditions of epidemiological restrictions for Covid-19 is carried out in a synchronous mode, with a time limit for responses

Module 3, Learning Assessment

An **"excellent"** mark is given to a specialist who systematically worked during this course, demonstrated a varied and deep knowledge of the programme material, successfully completed the tasks provided for by the Programme, is well versed in the basic and additional literature recommended by the Programme, demonstrates multidisciplinarity, communication, creativity and professional development, successfully completed all module's assignments, and correctly answered more than 90% of final test's questions. Competence level - high (creative)

A **"good"** mark is given to a specialist who has demonstrated complete knowledge of the educational and programme material, successfully fulfilled the tasks provided for by the Programme, has mastered the basic literature recommended by the Programme, has shown a sufficient level of knowledge in the discipline and is capable of independent learning in the course of further educational and professional activity, successfully completed all module's assignments and correctly answered 80 to 89% of final test's questions. Competence level - sufficient (constructive-and-variable)

Module 3, Learning Assessment

A **"satisfactory"** mark is given to a specialist who has demonstrated knowledge of the basic educational and programme material, to the extent necessary for further training and subsequent work in the profession, copes with the tasks provided for by the Programme, made some mistakes in the answers and when performing tasks, but has the necessary knowledge to work out the mistakes made under the guidance of a scientific-and-pedagogical staff and correctly answered 70% to 79% of final test's questions. Competence level - medium (reproductive)

An **"unsatisfactory"** mark is given to a specialist who did not reveal sufficient knowledge of the basic educational and program material, made fundamental mistakes in performance of the tasks provided for in the Programme, cannot use knowledge in further training without the help of a teacher, and could not master the skills of independent work and failed the final test with the number of correct answers less than 70%. The level of competence is low (receptive-and-productive). In such a case, re-study of the module is recommended

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Thank you!