Erasmus+

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O2- CURRICULUM AND INNOVATIVE COURSES FORMULATION ON ENVIRONMENTAL ENGINEERING AND WASTE MANAGEMENT

1 Curriculum Development Methodology and Template

The Curriculum Template follows the structure and methodology that will be the most effective for determining the VR WAMA courses that will be prepared, describing the general outlines for each one and also the different learning topics that will be covered in each one. Following factors will be consider:

- **Planned types, learning activities and teaching methods** - the following teaching and learning activities can be adapted and used in a range of course target groups[1]:
  - Concept mapping;
  - Participatory Learning in Action (PLA) Techniques;
  - Questioning;
  - Formative quizzes;
  - Problem-solving;
  - Debates;
  - Role-plays;
  - Freewriting;
  - Small group activities;
  - Social media activities (Facebook, Twitter, Youtube);
- **Teaching hours** - the precise timing is very important part of the course design. During the syllabus development is very important to consider a time necessary for active learning and for learners to complete major assignments and prepare for exams.
- **Mode of delivery** – the course content can be delivered in a variety of ways. However, the following innovative methods are required[2]:
  - *blended learning*, which encompasses a wide variety of designs, including:
    - technology enhanced learning (e.g. using pdf files or ppt presentations);

[1] Additional reading:
http://www.fctl.ucf.edu/TeachingAndLearningResources/CourseDesign/Assessment/content/101_Tips.pdf
https://www.uwc.ac.za/TandL/Pages/TandL-Activities.aspx

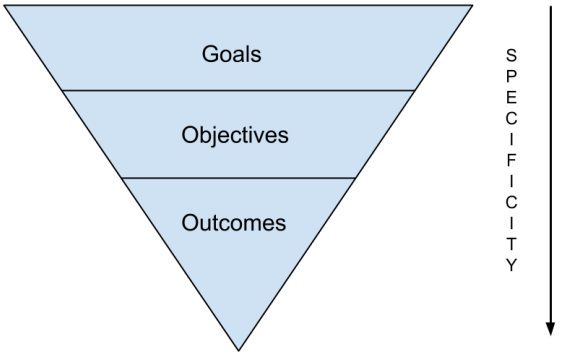
[2] Additional reading:
http://www.tonybates.ca/2015/02/03/deciding-on-modes-of-delivery/

        - learning management systems as a support tool for face-to-face teaching and for storing learning materials and online discussion;
    - *online eLearning*, as a form of distance learning, with no face-to-face teaching, including:
        - courses for credits or non-credit courses, offered online and cover the relevant content, assessments, self-testing tools etc.;
        - fully open courses, such as MOOCs;
        - open educational resources, which can serve as supporting materials for teaching and learning.

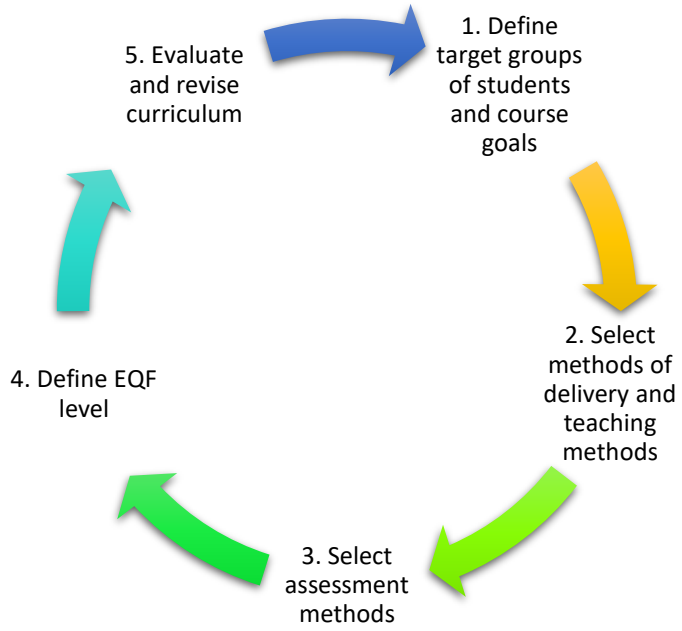
- **EQF level** - The European Qualifications Framework (EQF) acts as a translation device to make national qualifications more readable across Europe, promoting workers' and learners' mobility between countries and facilitating their lifelong learning. The EQF aims to relate different countries' national qualifications systems to a common European reference framework. Individuals and employers will be able to use the EQF to better understand and compare the qualifications levels of different countries and different education and training systems. Since 2012, all new qualifications issued in Europe carry a reference to an appropriate EQF level[3].
- **Assessment methods**[4] – the selection of appropriate assessment methods depends on factors like as planned learning outcomes, level of study, target groups of learners and their skills, knowledge and area of expertise, available resources, and delivery mode of the course and so on. Examples of assessment methods:
    - Case studies;
    - Examination;
    - Multiple-choice tests;
    - Practical project;
    - Self-assessment.
- **Course objectives & Learning outcomes of the course unit** – course objectives clearly describe what you intend course participants to learn by the end of the

[3] Additional reading:
https://en.wikipedia.org/wiki/European_Qualifications_Framework
[4] Additional reading:
http://facultyinnovate.utexas.edu/teaching/assess-learning/methods-overview
http://www.learningandteaching.info/teaching/assess_form.htm

course. Learning outcomes describe an intended or observed state, e.g. what your students will learn or what your students actually learned[5].



1.1 Process of Curriculum development



[5] Additional reading:
http://resources.depaul.edu/teaching-commons/teaching-guides/course-design/Pages/course-objectives-learning-outcomes.aspx

1.2 The Curriculum Template

Course title:

Planned types, learning activities and teaching methods:

Teaching hours:

Mode of delivery:

EQF level:

Assessment methods:

Learning outcomes of the course unit:

Detailed content for the course

Recommended or required reading:

Basic:

Recommended:

Language of the course:

2 Module 1: Environment introduction

Planned types, learning activities and teaching methods:

- Debates;
- Role-plays;
- Small group activities;
- Social game;

Teaching hours: 5+

Mode of delivery: Web 2.0 and virtual learning environment

EQF level: level 4

Assessment methods:

- online learning materials
- class deliverables
- papers, projects, presentations,
- portfolio.

Learning outcomes of the course unit:

The theoretical objective of this module is to learn about the basics information. Knowledge about the soil, water and movement of elements at the earth. Also we will teach about the biodiversity and its need for life on the earth. To understand better the climate change and impact for humanity. The theoretical objective will also include city and concept of smart cities as, at the moment majority of population lives and works in the city. The introduction will contain and green infrastructure and urbanisation.

The practical objectives include developing of perception of wholes, information on individual activity matters and call to action.

Learning module also provides some example of good practices, new perspective and call to action.

Detailed content for the course:

- Basics of pedology and short introduction of healthy soil
- Hydrology cycle and microplastics
- The basic conditions for life on planet Earth
- Explanation of biodiversity
- Climate change - short explanation of the reasons and impacts of the climate changes for human
- Smart cities

Language of the course: EN and all partners languages

3 Module 2: Human impact on the environment

Planned types, learning activities and teaching methods:

- Debates;
- Role-plays;
- Small group activities;
- Social game;

Teaching hours: 5+

Mode of delivery: Web 2.0 and virtual learning environment

EQF level: level 4

Assessment methods:

- online learning materials
- class deliverables
- papers, projects, presentations,
- portfolio.

Learning outcomes of the course unit:

The theoretical objective of this module is to learn about the linear model of the economy, change of the environment since the Industrial Revolution.

The practical objectives include discussion how a modern way of live negatively affect the quality of the environment. Learning module also provides some example of good practices.

Detailed content for the course:

- Explanation of linear economy and circular economy
- Extraction of raw materials explanation - mining, processing, and production of metals, plastics, and materials we use every day.
- Quality of life and the impact of metal processing and industry.
- How does climate change affect humans' lives?
- human activity affect the nature
- Introduction of waste categories.
- Problem of the underestimating of waste generated and lack of exploiting its

Language of the course: EN and all partners languages

4 Module 3: Circular Economy

Planned types, learning activities and teaching methods:

- Debates;
- Role-plays;
- Small group activities;
- Social game;

Teaching hours: 5+

Mode of delivery: Web 2.0 and virtual learning environment

EQF level: level 4

Assessment methods:

- online learning materials
- class deliverables
- papers, projects, presentations,
- portfolio.

Learning outcomes of the course unit:

The theoretical objective of this module is to learn about the circular models in comparation with the traditional linear model. The trainee will obtain knowledge how a producer a product to meet the requirements of eco-design and will understand the terms "end-of-life" and "when the matter becomes a waste".

The emphasis will be focused on types of waste contain source of raw materials or energy or whether it has any other form of "need".

The practical objectives include to problem solving tasks how to find the potential to re-use or how to return product and/or material to the beginning of production and change the procedure to meet the concept of circularity. Learning module also provides some example of good practices.

Detailed content for the course:

- Landmining and landfilling
- The value ofraw materials, the value of production
- Municipal waste, optical sorting,
  separation of different categories of plastic waste on “lines” with explanation “be hind the scene”
    - production form recycled plastic material beeing sorted. To explain, the stroy of plastic bottle form “end-of-life” to the “new product”

- recycling and it´s efficiency, recycling of different types of materials (glass, aluminium etc.)

- Waste composting – biodegradable introduction, zero waste and cradle to cradle production

Language of the course: EN and all partners languages

5 Module 4: Waste treatment methods

Planned types, learning activities and teaching methods:

- Debates;
- Role-plays;
- Small group activities;
- Social game;

Teaching hours: 5+

Mode of delivery: Web 2.0 and virtual learning environment

EQF level: level 4

Assessment methods:

- online learning materials
- class deliverables
- papers, projects, presentations,
- portfolio.

Learning outcomes of the course unit:

The theoretical objective of this module is to learn about the most important information on waste recovery methods and processes. The trainee will receive the knowledge about hazardous wastes, recovering energy. He/she will understand how the “incinerator” BAT and BREF look like and what are their principles.

Learning module also provides some example of good practices

Detailed content for the course

- Energy recovery, incineration, co-incineration.
- Disposal and methods of incineration waste

Language of the course: EN and all partners languages

6 Module 5: Use of waste in practice

Planned types, learning activities and teaching methods:

- Debates;
- Role-plays;
- Small group activities;
- Social game;

Teaching hours: 5+

Mode of delivery: Web 2.0 and virtual learning environment

EQF level: level 4

Assessment methods:

- online learning materials
- class deliverables
- papers, projects, presentations,
- portfolio.

Learning outcomes of the course unit:

The theoretical objective of this module is to learn about materials that can be used indefinitely (glass cycle, aluminium cans ..). The trainee will obtain knowledge how to use waste. He will learn why the re-use of waste is more appropriate in the process in which waste arises, what does it mean to modify waste and what are ways for returning waste to the cycle of origin production.

Learning module also provides some example of good practices.

Detailed content for the course

- Biodegradable plastics - more or less “new products”
- To approach the concept of zero waste strategy - not in the communal sphere but overall.
- Explanation of community concept

Language of the course: EN and all partners languages