Evolution of the CHERNE network according to the new Erasmus+ program

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Erasmus+

Overview

- Introduction
- What is the CHERNE network
- Strategic partnership: Blended learning in radiation protection and radioecology
  - Objectives
  - Implementation
  - Sustainability
- Conclusions

Situation of the Higher Education in Nuclear Sciences

- Decreasing of the global teaching offer due to
  - financial restrictions
  - lower interest of the young generation
- Important technological challenges
  - Development of new Nuclear Power Plant technology (Generation IV)
  - New European BSS related to radiation protection
  - Dismantling of old installations and waste management
- Need of well trained professional workers
  - high level of skills and competencies with important practical training

What is the CHERNE Network

- Open network bringing together academic institutions involved in education in Nuclear Engineering and Radioprotection (www.cherne.ntua.gr)
- 21 partners representing 10 countries
- Created in 2005
- Allows the sharing of large experimental devices and specific competences of teaching staff
- Organizing different learning/research activities:
  - Specific course of an Institution open to students of partners (increase the teaching offer)
  - IP courses (with the support of the European Lifelong learning program)
  - Erasmus exchanges
  - Access to PhD

New possibilities linked to Erasmus 2020 program

- Possibility to create large partnership including non academic partners

Strategic Partnerships aim to:

- **develop initiatives addressing one or more fields of education training**
- **promote innovation, exchange of experience and know-how between different types of organizations involved in education**, training and youth or in other relevant fields.

Strategic partnership: Blended learning in radiation protection and radioecology

Objectives:

- **Development of a blended learning program** in radiation protection and radioecology
- **Continuous education program** for people already *involved* in radiation protection
- **Acquisition of specific competences** in the nuclear field for those who were *not involved* in nuclear and radiological techniques during their studies
- **Contribution towards standardization of the knowledge across Europe** in radiation protection and safe use of radioactive materials

Partnership:

- Academic Partners (from the CHERNE network) representing **7 countries**:
  - HAUTE ECOLE PAUL-HENRI SPAAK (ISIB) – **BELGIUM**
  - UNIVERSITEIT HASSELT (UHasselt)- **BELGIUM**
  - FACHHOCHSCHULE AACHEN (FH Aachen) - **GERMANY**
  - UNIVERSITA DI BOLOGNA(UNIBO) - **ITALY**
  - UNIVERSIDADE DE COIMBRA - **PORTUGAL**
  - CZECH TECHNICAL UNIVERSITY IN PRAGUE (CTU) – **CZECH REPUBLIC**
  - NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA) - **GREECE**
  - UNIVERSITAT POLITECNICA DE VALENCIA (UPV)- **SPAIN**
- Non-academic partners to add value to the partnership:
  - a research institute: NATIONAL RADIATION PROTECTION INSTITUTE (SURO) – **CZECH REPUBLIC**
  - a regulatory body: GREEK ATOMIC ENERGY COMMISSION (EEAE) **- GREECE**
- The non-academic partners have been chosen according to their competence in a specific field and their possibilities to promote the program during and after this project

Development of the project

- *What are we trying to achieve?*
  - During the European funding: **to increase student employability** by offering a program that responds to the market needs:
    - E-learning platform
    - Real mobility
    - Internships
    - Certification (Europass Certificate Supplement and ECTS for students)
  - After the funding: in addition to the first aim, we also want **to increase the qualifications of the people already involved in the work market** by:
    - Extending the e-learning modules to this specific audience
- Duration of the funding: 2 years (from September 2015 to end of June 2017)

Ways to fulfil the objectives

- Blended means:
  - E-learning (= virtual mobility)
  - Training courses (= real mobility)
- For the students:
  - E-learning modules will be used as a preparation for advanced course modules, for selection of the students in the case of practical sessions (pre-requisite) and finally for the follow-up of the global program
  - Real mobility to access large experimental devices not present in each country and to be given the opportunity to do an internship in other EU countries.
- For the workers:
  - E-learning mobility to acquire new competences and for continuous education purposes

Intellectual outputs: deliverable proposed

- O1: Analysis of the present situation in radiation protection and radioecology within the European countries
- O2: Implementation of course modules on an e-learning platform
- O3: Training in Radiation Protection and Radioecology

For each output, we have defined

- A leading institution
- Partners, regarding skills of each participant

Project Deliverables

- Database/report on the market needs
- E-learning platform (including internship platform)
- Mobility trainings
- Certifications (Europass Certificate Supplement for professionals, Europass Certificate Supplement and ECTS for students) in the radiation protection field that can be recognized by the national authorities of the partner institutions.

- One partner (UNIBO) will be responsible of the global assessment of the deliverables

O1: Analysis of the present situation in radiation protection and radioecology within the European countries

- Leader: U Hasselt
- Aim:
  - Evaluation of the present situation
  - Evaluation of the need of the labour market in terms of skills and competences
- Deliverable:
  - Report will be presented next week during the CHERNE annual workshop and published on the project website

O2: Implementation of course modules on an e-learning platform

- Leader: EEAE (Greek Energy Atomic Commission) (organizing the platform)
- Coordinator of contents: NTUA (Technical University of Athens)
- Leader of each module have to coordinate the contents with Athens
- Aim:
  - Accessibility for workers
  - Pre-requisite for training modules
- Deliverable:
  - 6 e-learning modules of 2 ECTS each
  - Uploaded on a Moodle platform; power point, small web film and on-line exercises
  - First modules 1, 2, 4 and 5 are in a finalization phase and will be proposed during the winter term of next academic year to the students of each partner
  - Others will be presented during the summer term.

E-learning modules (1)

Title	Basics nuclear and radiation physics	Basics of measurement and dosimetry	Radiation protection
Subject	• Radioactivity, radionuclides and ionizing radiations • Nuclear reactions • Applied nuclear physics • Interaction between radiation and matter • Description of a radiation beam	• Measurement of • gamma, neutron,... • Spectrometry • Dosimetry	• Basic principles of radiation protection • EU legislation • Shielding evaluation • ALARA principles
Participants	SURO, Coimbra	Athens, CTU	UPV, EEAE
Leader	CTU	FHAachen	SURO

E-learning modules (2)

Title	General safety principles	Basics radiochemistry	Medical applications
Subject	• European legislation • Risk related to industry (chemistry, electricity, biology) • Risk assessment: methodology	• Introduction (principles, industrial applications of radionuclides) • radiochemical working techniques • decontamination techniques	• Medical techniques for diagnostics and therapy • Quality assurance • R P for workers and public • R P for patients
Participants	ISIB	FHAachen, U Hasselt	Athens, (Unibo, FH Aachen) EEAE
Leader	UPV	ISIB	Coimbra

E-learning platform: use

- During the funded part of the SP, these e-learning modules will be used for:
  - the preparation of the training modules
  - the selection of the students in the case of practical sessions
  - the follow-up of the global program

- Afterwards, the modules
  - can be followed individually as continuous education for workers who need to develop specific skills (sustainability)with some fees
  - can become part of regular courses of academic partners
  - can be used for specific training in radiation protection (Radiation Protection Officer)

O3: Training in Radiation Protection and Radioecology

- Mobility training will consist in **5 days of experimental work on real devices**.
- The training modules will involve **student mobility** and **staff mobility (from academic and non-academic partners)**.
- The **institutions where the different modules will take place, will also be in charge of the development of each module**.
  - These institutions have been chosen according to the experimental devices they can give access to.
  - But other partners can of course contribute to the development or the implementation of a part of the module.
- A total number of **16 students/module is foreseen**.
  - The student selection is based on their knowledge in **nuclear and radiation physics** (developed in the distance learning module) and in **English**

O3: Training in Radiation Protection and Radioecology

- Leader: CTU
- Aim:
  - Real mobility
  - Uses of large specific devices
- Deliverable: 6 training modules of 2 ECTS each
- A coordinator for each training activity have been defined
- Recognition
  - ECTS certificate to be used in the own institution
  - Europass Certificate Supplement delivered to increase participant employability.

Training modules (1)

Title	probability risk assessment.	Environmental measurements	Safe industrial applications of radiation and radionuclides
Subject	• Principle of risk assessment • Applications in nuclear industry. • Exercises on software for specific cases	• Introductive lectures • Field trip and sampling • Analyze of samples in the laboratory	• Introductive lectures • Radiation protection in industry: real manipulation on large devices • ALARA workshop
Participants	ISIB	ISIB, SURO, NTUA	SURO, Coimbra, NTUA, FH Aachen
Leader	UPV (01-2017)	Uhasselt (04-2017)	CTU (09/2016)

Training modules (2)

Title	Radiochemistry	Radioactive waste management	Practical radiation protection in medical field
Subject	• Radiochemical techniques • Safe handling of radionuclides • Tracer applications • Decontamination techniques	• Identification of radioisotopes: • Evaluation of the activity, energy and efficiency calibration(experimental and/or MC calculation, Activity measurement in real samples)	• R P of the workers, patients and public • Practical cases • Measurement of doses • Calculation of shielding
Participants	EEAE, UPV	ISIB	Coimbra, CUT, GEAC
Leader	ISIB FHAachen,(09/2016)	FHAachen, Uhasselt	Unibo

Sustainability of the training modules: Development of local partnership

- Material developed for training modules during the first phase of the strategic partnership can be re-used by partners
- "Geographic partnership" can be created to bring together teaching staff and students with low travel cost
- Encourage collaboration between partners acting in the same geographical area
- One "Geographic partnership" already exists since more than 5 years
  - Uhasselt and ISIB have developed since 2009 a 2 week intensive program dedicated to measurements of radionuclides in the environment
- Others can be created in relation with the development of an e-learning or a training module

Conclusions

- Regarding future developments, it is essential to maintain a high level of competences and skills in the framework of safe use of nuclear facilities, radiation protection and waste management
- European harmonization is going on with the new BSS
  - Teaching and learning tools have to be developed within European collaborations
- Erasmus + (2020) gives good opportunities to build a large partnership
- Sustainability have to be achieved after European funding