ECTS file
2010/2011

CHERNE activity XIOS-ISIB

Subject:	CHERNE activity XIOS-ISIB
Subject code	NT/CHERNE/09
Programme:	Nuclear technology
Coordinator:	Robert Schaeken
ECTS credits:	4

Prerequisites
Elementary knowledge about radiation physics, radiation measurement and radiation dosimetry is expected.

Objectives
The participants will have enlarged their view on and their competencies in applied nuclear physics, nuclear measurement and radiation protection in a more practical environment and in a much broader field than usually associated with nuclear energy alone.

Content
Title: XIOS- ISIB - Measurements of Environmental Radioactivity (XIMER 2011)

This project is organised as a 'Cherne activity' by the Nuclear Technological Centre NuTeC of XIOS, in collaboration with our French-speaking colleagues from ISIB-Brussels. 'Cherne' is an international network for cooperation in higher education on radiological and nuclear engineering, established in 2005 in Valencia by seven initial academic partners, including XIOS.

The goal of XI-MER is to involve the students in measurements of the radioactivity in the environment. Both the artificial and natural contaminations will be examined. While the activity itself will focuss on the measurement techniques, the output will also be a better understanding of our radioactive environment and a better evaluation of what can be harmful and what has to be accepted.

ISIB and XIOS-NuTeC are proposing a two weeks course to confront the participants with eventual problems regarding radioactivity in our environment. The course will mix, approximately in 30/70 proportion, lectures and practical exercises (field trips and laboratory work). It will include an evaluation part.

The participants will be in the first place the ISIB and XIOS students studying in the field of nuclear technology (either all of them, or part of them). Apart from them individual international students from the Cherne partners are welcome. For practical reasons and with regard to the available capacity the total number of participants is limited to 16.

Learning outcomes

- The student has a good understanding of nuclear and radiological problems in the environment (artificial and naturally occurring radioactivity).
- The student has a good understanding of the radiological problems for the population (environment, radon, radioactive waste,...).
- The student has a good understanding of, and can work with typical measuring instruments for nuclear measurement and radiation protection.
- The student can determine and interpret the exposure to radiation.
- The student can determine and interpret the radioactive contamination (the nature of the contaminated radioactive material, its activity, its concentration, the physical and chemical condition)
- The student has a good understanding of and can work with the common software packages for nuclear measurement.
- The student can perform an elementary dosimetric analysis of (potential and actual) exposure of employees and the population.
- The student can determine the individual dose (artificial, natural and environmental).
- The student can collect and study relevant information.
- The student can carry out the practical experiments accurately and safely, in mixed groups of 2 or 3 students within the time provided.
- The student can write short reports on the practical exercises: the data, the calculations on the data and a discussion.
- The student can write a detailed report on one practical exercise: the formulation of the problem, the theoretical background, the course of the experiment, the results with the correct units and the insecurities, the results of the calculations, the interpretation and discussion of the final results and the conclusion.
- The student can give an English PowerPoint presentation on the detailed lab report, for an audience consisting of the professors and a group of fellow students

Evaluation

Written exam

Multiple choice questions (and open questions)

Oral exam

The students present in mixed groups a detailed report on the field trips and the short reports on the other practical exercises.

Working methods

- Lectures with PowerPoint presentations or slides
- Practical exercises: field trips, laboratory work, software use

Learning materials

- Collection of lecture notes from F. Tondeur, I. Gerardy, W. Schroeyers, H. Janssens and S. Schreurs
- Collection of lab notes of F.Tondeur, I. Gerardy, L. Lievens and S. Schreurs