CHERNEws

Internal information bulletin of the CHERNE network

#4 - October 1, 2015
Editors: I. Gerardy, F. Tondeur

CONTENTS

1. CHERNE 2015 council in Minsk

The annual council of the CHERNE network was held in Minsk, June 2, 2015, during the annual workshop. The minutes of the council are given as an annex 3 at the end of the present bulletin.

The council confirmed the acceptation of two new members: Universidade da Beira Interior (UBI), Covilhã (Portugal), represented by prof. Sandra Soares, and Department of Physics, Università degli Studi di Milano (Italia), represented by prof. Flavia Groppi.

The CHERNE declaration, which defines the goals and the organization of the network, was amended on two points:

- The administrative organization is defined with more detail, better specifying the roles of the secretary and of the advisory committee, and introducing the functions of the platform coordinator and of the bulletin coordinator.
- Associated members who didn't participate in any CHERNE activity during the last 5 years or were not present at any yearly CHERNE workshop during the last 5 years will not remain a member of the CHERNE network

Isabelle Gerardy (Brussels, Belgium) was elected as secretary for the period 2015-2016. She will be helped in the advisory committee by Herwig Janssens (Diepenbeek, Belgium), Frieder Hoyler (Julich, Germany), Tatsiana Savitskaya (Minsk, Belarus) and Domiziano Mostacci (Bologna, Italy), and by Marios Anagnostakis (Athens, Greece) as platform coordinator and François Tondeur (Brussels, Belgium) as bulletin coordinator.

The council approved the dates and place of the 2016 CHERNE workshop, to be held in Cervia (Italy), May 22-25.

The proposed CHERNE activities for 2015-2016 were presented and discussed during the workshop in round table 1, the summary of which is given as an annex 4 of this bulletin.

2. Launching the strategic partnership in Radiation Protection

Erasmus +
During many years, CHERNE built its success on the development of Erasmus Intensive Programs. But since 2014, the IPs as such are not eligible anymore, but can be included in one of the new cooperation formulas introduced in the Erasmus+ program settled in the framework of the Horizon 2020.

Strategic partnerships
Strategic Partnerships aim to support the development, transfer and/or implementation of innovative practices at organisational, local, regional, national or European levels with the aim of, for instance:

- enhancing the quality and relevance of the learning offer in education, training and youth work by developing new and innovative approaches and supporting the dissemination of best practices;
- increasing labour market relevance of learning provision and qualifications and reinforcing links between education, training or the youth fields with the world of work;

The strategic partnership in Radiation Protection
The project of strategic partnership educational program in radiation protection, first submitted in 2014 to the Belgian National Agency (French speaking), was re-submitted and accepted in 2015. The partnership includes ten partners, eight of which are members of CHERNE: ISIB Brussels, U.Hasselt, U.Coimbra, UPV Valencia, AcUAS Jülich, CVUT Prague, NTUA Athens, U.Bologna. The other two partners are regulatory bodies (SURO Prague and EEAE Athens). The coordination of the project is in the hands of Isabelle Gerardy at ISIB, Brussels. The project was launched on Sep. 1, 2015, for two years.

Contents
The teaching and training content fully complies with requirements of modern educational structures, in the field of radiation protection. In our proposal, the access to learning materials for a large group of student and professionals is made easier through the use of e-learning systems. The program is focused on students from partner or other European Universities, as well as on employed professionals (such as members of Regulatory Bodies, hospital employees, firms and research centers), concerned by ionizing radiations and willing to improve their skills or to restore their knowledge in the field of radiation protection.

The program consists in 6 intensive courses:

- Monte Carlo in particle transport
- Advanced nuclear measurements
- NORM
- Radioecology
- Waste management
- Probability risk assessment

and 6 modules of e-learning:

- Basics of nuclear and radiation physics
- Basics of measurements and dosimetry
- Radiation protection
- General safety principles
- Basics of radiochemistry
- Medical applications of radiation and radionuclides.

The contents of each course were carefully selected. The preparation of educational programs and their later implementation is planned to be a joint effort of all partners. To this end, several working meetings including all European potential partners were already organized with the purpose of performing an overview of the comprehensive situation in teaching and training radiation protection programs. These meetings were organized in 2014 in Mol and Hasselt (Belgium), Bologna (Italy) and Thessaloniki (Greece) and in 2015 in Prague (Czech Republic).

An important part of the project is related to the harmonization of training and teaching programs in different European countries, with the perspective of developing the skills defined in the directive 2013/59/EURATOM (Dec. 5, 2013). These activities aim at ensuring a sustainable development of competences for technological key fields for the future, e.g. nuclear energy (including decommissioning and waste management), health (nuclear medicine, radiation therapy), etc.

The 24 ECTS program is divided into three types of teaching activities, plus an internship. The teaching activities include distance learning, proposed for basic knowledge modules, advanced courses and practical training.

Besides the acquisition or refreshment of the knowledge in radiation protection, a strong attention will be given to the following aspects: improving independence in making decision; improving skills from own results presentation in an international group of students; improving skills to stand up for personal opinion; improving experimental skills by using new devices and data processing; creating new friendships with the students from different European countries – new personal contacts for future collaboration; improving students language skills, etc. Students and professors will have the opportunity to participate in advanced experiments, which are often not possible in the standard organization of their own universities. They can also have the possibility of exchanging information about study programs in their field in different European universities, a first step for inter-university study organisation.

3. CHERNE platform

A new web platform has been set up since March 2015 to enhance collaboration among members of the CHERNE community. The platform is available at http://www.cherne.ntua.gr/.

It contains public information about the CHERNE organization, members and activities, similar to the previous CHERNE website, but also provides a new area accessible only by CHERNE members with a forum, calendar and announcements.

The platform has been developed and is maintained by the NTUA Nuclear Engineering Department.

To request login credentials, provide material or suggest corrections and improvements, please contact Marios Anagnostakis at managno@nuclear.ntua.gr.

4. CHERNE activities of the next semester (Sep.2015-Jan 2016)

Details about the organisation of these courses are given in annexes 1 and 2. Please disseminate this information among your students.

SOFT COMPUTING

20-hour intensive course (Master level) at UPValencia, 2-6 Nov. 2015.

Deadline for registration : 22 Oct. 2015.

III GEANT4 International School

1-week intensive course (Master & Doctoral level) at INFN/LNS Catania, 9-13 Nov.2015.

Deadline for registration: 15 Oct.2015

https://agenda.infn.it/conferenceDisplay.py?confId=9689

WATER ISSUES AT NP PLANTS

This intensive course will be organised at BSU, March, 15-25th, 2016. More information will be given in the next issue of the bulletin.

5. Recent CHERNE intensive courses

RADAM 2015

The RADAM (Radiation and Measurement) course took place from Aug. 31 to Sep. 4, 2015 in Jülich. The course was attended by 11 students (5 from FH Aachen, 4 from ISIB, and 3 from Brazil). So unfortunately only the ISIB students were from the CHERNE network.

The course started with 3 experiments which were performed on 6 stations in parallel.

1. GM-counter characteristics, dead-time measurement using the 2-source method, and counting statistics

2. Calibration of a 2π-proportional counter: characteristics to discriminate α from β-particles, efficiency calibration using a KCl-sample.

3. Energy and efficiency calibration of NaI-scintillators using calibration sources. Identification of unknown samples.

The first experiments were finished on Tuesday noon. In the following 2.5 days 5 groups were formed which had to perform 5 experiments.

1. Alpha-spectrometry using a mixed source. Energy loss studies using Al-foils and comparison with SRIM-calculations, and measurement of an air-filter sample.

2. Liquid-scintillation counting using several unquenched calibration sources. Determination of a quench-parameter for ^{14}C using a quench series and analysis of an unknown ^{14}C-sample. Measurement of β-absorption and backscattering from different samples.

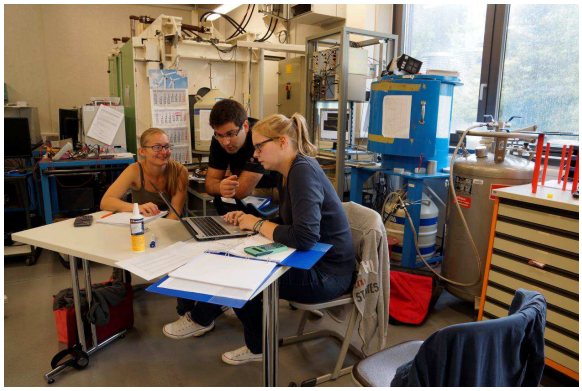
3. Gamma-spectrometry using a 40% n-type Germanium detector. Energy and efficiency calibration. Determination of the activity of an unknown coin containing Cu and Mn which was activated in the 370 GBq AmBe neutron source of the FH Aachen. The neutron-flux was determined in analyzing an In-foil which was activated at the same position.

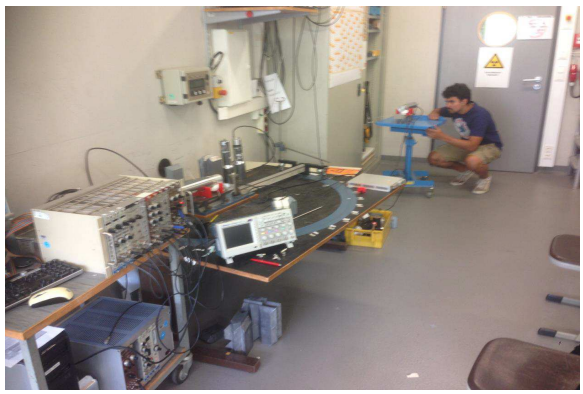
4. Neutron activation was measured using the rabbit system of the FH Aachen. This system allows to measure for example the 2 s isomeric state in ^{116}In which deexcites to the well-known 54 min. isomeric state in this nucleus. Other samples like Silver (with 2 half-lives and Selenium) have been recorded. In parallel the activation curve of Indium was recorded using a sample changing device which allows to irradiate

a sample close to the source and then to transport the sample to a counting position.

5. Coincidence-measurements using a NIM fast-slow-electronics set-up. The coincident energy signals from 2 NaI-scintillators where recorded together with the timing information from TAC in 3 spectra: Energy1, Energy2, Time. The timing branch was realized using 2 TSCA. In this way energy gates could be selected on the TSCA to demonstrate the effect of selecting a gate and observing the coincident signals. Furthermore this set-up was used to demonstrate the angular correlation in the annihilation radiation and finally also to measure the speed of light. The TAC was calibrated using a ns cable-delay. The change in time between Start and Stop signal between the 2 detectors was then recorded for the 511 keV radiation in moving one of the detectors up to 2 meter away from the source (see photo).

The last day was devoted to data-analysis and the presentation of the experimental results in a short presentation by each group. The very intense week ended with a get-together in the seminar room. Not to forget that on Wednesday the group enjoyed a nice evening in a typical Greek restaurant in Jülich. Special thanks are due to Uwe Schröer the engineer of our laboratory and Florian Reisenhofer an EMINA student and electronics specialist, without their help this course would have been a disaster! Here are some pictures from the course.





SARA 2015

The one-week intensive course in *Safe Application of Radiation and Radionuclides* was held at the Faculty of Nuclear Sciences and Physical Engineering CTU in Prague from March 29 to April 4. 21 students and 8 professors from 11 European universities participated in the program, which consisted of 6 specialized lessons and 8 practical exercises, 3 thematic visits (Visit of Proton Therapy Centre, National Radiation Protection Institute, TOKAMAK Golem), small student´s conference and lot of social activities. The course was awarded 4 ECTS.

The program offered the possibility of educational level comparison for professors as well as for students. It also provided information regarding the possibility of concluding studies on another university. The team of 21 students over a week-long interaction with pedagogues created an ideal situation for sharing experiences between professors and students. Through those activities the program contributed to education harmonization in the area or radiation safety and assisted in forming true experts on the European level. The lessons learned were focused mainly on: Health risks of external and internal exposition to radiation; Detectors and detection; Analytical methods (XRF, etc.); Dosimetry in radiation protection; Medical use of ionizing radiation; Radioactive waste monitoring.

The practical exercises were organized in international subgroups, allowing the participants to communicate and interact with students from different countries and backgrounds. At the end of the course, each subgroup has presented their exercise results to the rest of the students. List of exercises covered Gamma spectrometry; Imaging (Timepix); XFR – microanalysis; Radon and thoron in soil gas investigation; Whole body counter; Environmental radioactivity monitoring; Sparrow nuclear reactor exercise 1, 2.
The social activities organized during the week included a welcome party and evening events, especially: Historical tram trip and Social dinner.

INDUSTRIAL RADIOGRAPHY

A detailed report describing this intensive course is given in annex 6

6. CHERNE workshop 2016

The XIIth CHERNE Workshop will be held in Cervia (in the province of Ravenna, Italy), May 22nd to 25th. Please mark the date on your agenda. Contacts are being made with local hotels, and further news will be circulated as soon as they become available.

7. Updating CHERNE databases

The database of **CHERNE electronic addresses** is sent to the members together with the present bulletin. Please send any additional information for the databases to I. Gerardy and F. Tondeur.

8. CHERNEws is your bulletin

All CHERNE members are invited to send short communications, related to the CHERNE objectives, which they believe interesting for the other members. CHERNE objectives are described in the CHERNE declaration on www.upv.es/cherne .

Here you can announce conferences, job offers, call for partners for your projects …

Send your text to both editors gerardy@isib.be, tondeur@isib.be .

Travel grant for staying at ISIB, Brussels
IRISIB, the research institute of ISIB, HESpaak, Brussels, offers a grant for a research stay of 3 to 6 months for a CHERNE PhD student. Students at the master level may be accepted too. The proposed R&D work includes MC simulations and measurements in X-ray spectrometry. The grant will cover the local expenses during up to 6 months, and the travel costs from and to home. Details, amount, procedure can be asked to Isabelle Gerardy gerardy@isib.be .

ANNEX 1

CHERNE 2015-16

Project Plan for CHERNE activities and other actions proposed to the network

Acronym/Short title of the project: SOFT COMPUTING	

Context	This project plan is meant to inform CHERNE partners and their students about an activity organised in the framework of the CHERNE network, taking into account the objectives of CHERNE as described in the CHERNE declaration www.upv.es/cherne
Definitions	IC: Intensive course, at least 1 week/2 ECTS SP: strategic partnership (may include intensive programmes and other actions) IP: intensive programme, part of the actions of a SP

Title of the project and acronym (if applicable)	**INTRODUCCIÓN A LOS MÉTODOS DE SOFT COMPUTING EN INGENIERÍA: ALGORITMOS GENÉTICOS, REDES NEURONALES Y LÓGICA FUZZY**
Type of the project	IC
Main objective of the project	1. Introduction on advanced computational methods for fault diagnostics and prognostics and engineered systems 2. Introduction to soft compting methods 3. Artificial neural networks: theory and applications for real time online monitoring and diagnostics of complex components, plants and processes 4. Genetic algorithms: theory and applications in reliability, availability and maintenance 5. Fuzzy logic systems: theory and applications for fault diagnostics and prognostics
Date of the project	2 - 6 November 2015 (20 hours)
Place(s) of the project	UPV
Coordinator(s)	J. Ródenas, UPV, jrodenas@iqn.upv.es
Other partners	Course given by Prof. Enrico Zio from Politecnico Milano
Intended participants Expected present studying level of participants and their specialisation (if relevant)	students (Ma) the activity is organised for the own students, free places are open for students of CHERNE partners
Prerequisites Expected initial knowledge	Matlab, statistics, Monte Carlo
Intended or maximal number of participants	MAXIMAL 10 out UPV
Evaluation (of participants, by	Written work evaluated by Prof. Enrico Zio

participants, by organisers, …)	
Is the project part of an Erasmus program?	No
ECTS or ECVET credits applicable? How many?	No official credits as no fees are paid. Just a certificate, with mark if the evaluation is positive. 2 ECTS
Terminology	CHERNE: Cooperation for Higher Education on Radiological and Nuclear Engineering other: …/…
Practical organisation	Accommodation : not organised
Costs for the students (if applicable)	Travel : not covered Accommodation : not covered Social events: No Tuition fee: 0 €
Extra information or conditions	Deadline for pre-registration **22 October 2015** The course is foreseen to be given in Spanish. It would be changed to English if foreign students are present.

ANNEX 2

CHERNE 2015-16

Project Plan for CHERNE activities and other actions proposed to the network

Acronym/Short title of the project: III GEANT4 International School	

Context	This project plan is meant to inform CHERNE partners and their students about an activity organised in the framework of the CHERNE network, taking into account the objectives of CHERNE as described in the CHERNE declaration www.upv.es/cherne
Definitions	IC: Intensive course, at least 1 week/2 ECTS SP: strategic partnership (may include intensive programmes and other actions) IP: intensive programme, part of the actions of a SP

Title of the project and acronym (if applicable)	Monte Carlo calculation method and official basic Geant4 School
Type of the project	IC (one week)
Main objective of the project	The project main aim is to give to the students an introduction to the Monte Carlo computational method, and to provide them a full basic course on the Geant4 Monte Carlo simulation toolkit. The project will include theoretical lessons and practical hands-on sessions.
Short description of the project	The project will include an introduction on the C++ programming language and on the Monte Carlo approach for the simulation of particle passage into the matter. A series of lessons will then describe the Geant4 code and the principal elements to construct with it a simple simulation software.
Expected learning outcomes (if applicable)	At the end of the project the students will know the basis of the Monte Carlo approach for the simulation of the passage of particles into the matter and will be able to write a complete simple Geant4 application
Date of the project	November 9, 2015 8:30 - 13:00 Theoretical Session I (OpenCL standard, Parallel computation GPU) 13:00 - 14:30 Lunch 14:30 - 20:00 Practical Session I (OpenCL standard, Parallel computation GPU) November 10, 2015 8:30 - 13:00 Theoretical Session II (OpenCL standard, Parallel

	computation GPU) 13:00 - 14:30 Lunch 14:30 - 20:00 Practical Session II (OpenCL standard, Parallel computation GPU) November 11, 2015 8:30 - 13:00 Theoretical Session I (C++ concepts and Monte Carlo method) 13:00 - 14:30 Lunch 14:30 - 20:00 Practical Session I (geant4 Installation) November 12, 2015 8:30 - 13:00 Theoretical Session II (Geant4 main elements) 13:00 - 14:30 Lunch 14:30 - 20:00 Practical Session II (Geant4 exercises on real applications) November 13, 2015 8:30 - 13:00 Theoretical Session III (Geant4 main elements) 13:00 - 14:30 Lunch 14:30 - 20:00 Practical Session III (Geant4 exercises on real applications)
Place(s) of the project	Catania INFN/LNS
Coordinator(s)	Giuseppe CIRRONE
Other partners	PhD in Physics – University of Catania
Is the partnership still open to more partners?	closed
Intended participants Expected present studying level of participants and their specialisation (if relevant)	Students (Ma, PhD) and post-docs The activity is organised for the Catania University students and INFN staff members; places are open for students of CHERNE partners.
Prerequisites Expected initial knowledge	English language requested C++ programming tools
Intended or maximal number of participants	20
Working method, time schedule and deadlines for the organisation and for the task force	CHERNE member basic conditions apply. https://agenda.infn.it/conferenceDisplay.py?confId=9689
Evaluation (of participants, by participants,by organisers)	By organizers
Is the project part of an Erasmus program?	No
ECTS or ECVET credits applicable? How many?	2 ECTS
Are any other industrial or research non CHERNE partners involved?	INFN/LNS
Terminology	CHERNE: Cooperation for Higher Education on Radiological and Nuclear Engineering
Practical organisation	Accommodation : organised
Costs for the students (if applicable)	not covered Accommodation: INFN/LNS Guest House (students must apply for free accommodation, with regard to the LNS funding availability) **SCHOOL FEE € 150**

ANNEX 3

CHERNE

2015

11th CHERNE Annual Council

MINUTES

Minsk, Belarus

2 June 2015

AGENDA

1. ***Acceptation of new members:***
   a. ***Universidade da Beira Interior (UBI), Covilhã (Portugal).***
   b. ***Department of Physics, Università degli Studi di Milano (Italia)***
2. ***Update of the list of members (see annex).***
3. ***Amendments to the CHERNE Declaration.***
4. ***Election of Secretary.***
5. ***Analysis of activities developed during last year.***
6. ***Advisory Committee.***
7. ***Next Annual Workshop venue.***
8. ***Activities programmed for the next year.***

a. *Erasmus Strategic Partnership.*

b. *Courses.*

9. *Electronic bulletin 'CHERNEws'.*

10. *CHERNE platform.*

11. *Requests and questions.*

In the meeting room of the BSU, Minsk, Belarus, in the aftenoon of 2 June 2015, it starts the CHERNE Annual Council with the following attendants:

Isabelle Gerardy	**HE Spaak·ISIB, Brussels, Belgium**
Herwig Janssens	**University of Hasselt, Diepenbeek, Belgium**
Friedrich Hoyler	**FH Aachen – Jülich, Germany**
Vincenzo Bellini	**University of Catania, Italy**
Lenka Thinova	**Czech Technical University in Prague, Czech Republic**
Tatsiana Savitskaya	**Belarusian State University, Minsk, Belarus**
José Ródenas, Secretary	**Universidad Politécnica de Valencia, Spain**

Vincenzo Bellini asks for changing the agenda, discussing the point 4 before than the point 3. It is accepted by 5 votes.

1. *Acceptation of new members.*

It is confirmed the acceptation as new members of

Universidade da Beira Interior (UBI), Covilhã (Portugal).

Department of Physics, Università degli Studi di Milano (Italia)

The Secretary proposes Prof. Herwig Janssens as individual member after knowing that he will retire in September 2015. It is accepted by acclamation.

2. *Update of the list of members.*

According to the CHERNE declaration and the Annex I to the Agenda sent on 24 April 2015 to all CHERNE members, for the 2015/2016 period (until the next CHERNE Council), the list of members is as follows:

FULL MEMBERS.

- Universidad Politécnica de **Valencia** (UPV), Valencia (Spain)
- Institut Supérieur Industriel de **Bruxelles** (ISIB) - (Belgium)
- Hasselt University, **Diepenbeek** (Belgium)
- University of Applied Sciences Aachen, **Jülich** Campus (Germany)

- Czech Technical University in **Prague** (Czech Republic)
- Facoltà d'Ingegneria, Alma Mater Studiorum - Università di **Bologna** (Italia)
- National Technical University of **Athens** (Greece)
- Aristotle University of **Thessaloniki** (Greece).
- Belarusian State University, **Minsk** (Belarus).
- Università degli Studi di **Catania** (Italia)
-

ASSOCIATE MEMBERS

- Universidad de **Salamanca** (Spain)
- Universidade de **Coimbra** (Portugal)
- Instituto Superior Tecnico (**IST**), Lisboa (Portugal)
- Nuclear Engineering Department, Politecnico di **Milano** (Italia)
- Department of Nuclear Engineering of Università degli Studi di **Palermo** (Italia)
- Department of Physics, Università degli Studi di **Messina** (Italia)
- Escola Tècnica Superior d'Enginyeria Industrial (ETSII), UPC, **Barcelona** (Spain)
- Kansas State University (KSU), Manhattan, **Kansas** (USA)
- University of Cadi Ayyad, **Marrakech** (Morocco)
- Universidade da Beira Interior (UBI), **Covilhã** (Portugal)
- Department of Physics, Università degli Studi di **Milano** (Italia)

INDIVIDUAL MEMBERS

- Dr. **Dieter Hennig**, Berlin (Germany)
- Prof. **Francois Tondeur**, Brussels (Belgium)
- Prof. **Herwig Janssens**, Diepenbeek (Belgium)

3. Election of Secretary.

Isabelle Gerardy from HE Spaak·ISIB, Brussels, Belgium, is presented as candidate for Secretary for the period 2015-16. She is accepted by acclamation.

4. Amendments to the CHERNE Declaration.

Three amendments to the CHERNE declaration are proposed to the council, the members vote for each of them:

1. existing:
    - CHERNE has a minimal administrative organisation, ensured by the secretary elected at the annual meeting. The secretary is assisted by an advisory committee, the composition of which is approved by the annual meeting. The

secretary will manage a Web page through which the activities of the network will be communicated. At this moment it is www.upv.es/cherne

- to be replaced by:
    - CHERNE has a minimal administrative organisation, ensured by the secretary elected at the annual meeting. The secretary will coordinate and stimulate the activities of CHERNE, with the help of an advisory committee, the composition of which is approved by the annual meeting. The secretary will coordinate and stimulate the advisory committee, coordinate the CHERNE platform (webpage), with the help of a platform coordinator and his/her local ICT service, coordinate the CHERNE Bulletin, with the help of a Bulletin Coordinator, coordinate and organise the yearly CHERNE Workshop, with the help of the local organisers and the advisory committee, promote the network at relevant places and times (conferences, meetings, courses, …).

This amendment is accepted by the council

2. existing:
    - Full members are academic or research institutions that have (co)organised a CHERNE activity in the last year or will do so in the next year. Full members have the right to vote in the general assembly.

- to be replaced by:
    - Full members are academic or research institutions that have (co)organised a CHERNE activity in the last year or will do so in the next year.
    - Full and Associated members have the right to vote in the general assembly, with one vote for each institution present at the meeting.

This amendment is rejected by the council

3. new:
    - Associated members who didn't participate in any CHERNE activity during the last 5 years or were not present at any yearly CHERNE workshop during the last 5 years will not remain a member of the CHERNE network

This amendment is accepted by the council

5. Analysis of activities developed during last year.

This point has been developed in the first Round Table moderated by Herwig Janssens. It is summarized here. Some courses organized by one of the members have been opened to CHERNE network. For some activities, students came from other partners:

- RADIOCHEMISTRY: Methods and applications in Radiochemistry (9 – 13 March 2015) in UPV with 10 students of BSU
- XIMER: Measurements of Environmental Radioactivity (16 to 27 March 2015) in Diepenbeek (UHasselt-NuTeC) and Brussels (ISIB) with 1 student of Bologna
- IC-RAD: Intensive Course on Industrial Radiography September 29 to October 3, 2014 in NTUA (Greece) with 3 students of FH Aachen-Julich

Other courses were organised but without the participation of students from other partners:

- IMAGING: Formation, Acquisition and Processing of Images in Nuclear Medicine Techniques (4 – 8 May 2015) UPV
- Soft Computing: An Introduction to Soft Computing Methods in Modern Engineering: Genetic Algorithms, Neural Networks and Fuzzy Logic (3 – 7 November 2014) UPV
- NATURAL RADIOACTIVITY: Protection against Natural Ionizing Radiation (24 – 28 November 2014) UPV

Some activities were developed within the CHERNE network:

- SARA: Safe Application of Radiation and radionuclides (30/03/15 – 03/04/15) CVUT
- RADAM: Radiation Detection and Measurement (Aug., 31st – Sep., 4th , 2015) FH Aachen Campus Jülich
- MARC: Methods of Applied Radiochemistry (Sep 7-11, 2015) FH Aachen Campus Jülich

6. Advisory Committee.

Following the first amendment accepted, an advisory committee is chosen by the council to help the secretary for the management tasks. For the next year, the committee will be composed by Herwig Janssens, Frieder Hoyler (FH Aachen Julich) and Tatsiana Savitskaya (BSU). The secretary will ask Domiziano Mostacci (University of Bologna) to join the committee.

7. Next Annual Workshop venue.

Enzo Bellini (University of Catania) presents a joint proposal of three Italian partners (University of Catania, Bologna and Milano) to organise the Workshop of 2016 in Cervia, close to Ravenna (Italy). The council accepts the proposition.

8. Activities programmed for the next year.

a. Erasmus Strategic Partnership.

A strategic partnership (Erasmus+, Horizon 2020) has been submitted in late March to the French speaking European Agency of Belgium. This partnership proposes to enhance the skills in radiation protection by means of virtual (e-learning) and real mobility (join-courses, like the old IP organisation) for a period of two years. Eight CHERNE members are partner in this program. Two non academic institutions (Greek Nuclear Agency and the Radiation Protection Institute from Prague) are also involved in the program.

The result of the selection is expected for August. If the program is funded, some courses will be developed during the next academic year.

b. Courses.

Other courses proposed by CHERNE partners for next academic year have been discussed during the round table 1. The list is presented in an annex of this document. The coordinator of each activity has to fulfil the document (Application form) in order to give practical information to all partners. The forms have to be sent to the coordinator of the platform.

9. Electronic bulletin 'CHERNEws'.

The council proposes to continue the publication of the CHERNE Bulletin. The contents of the bulletin can include announcements of courses, conferences or workshops but it will mostly contain small articles about CHERNE activities (courses, student or staff exchange, journey of scientific or technical sites).Two publications per year, in April and September, will allow a good diffusion of the information.

The coordinator of the bulletin is François Tondeur.

Nevertheless, the platform might become the first and the fastest way to disseminate information.

10. CHERNE platform.

The CHERNE platform is operative now and managed by NTUA. All important information about future courses, internship propositions, etc. have to be implemented on the platform. The actual website should be redirected to the platform.

The website will disappear, moving all the information to the platform. This will require some formal amendment of our declaration.

The coordinator is Marios J. Anagnostakis.

The secretary will contact the platform coordinator in order to see the most efficient way to increase the visibility of the different activities for the students and the staff.

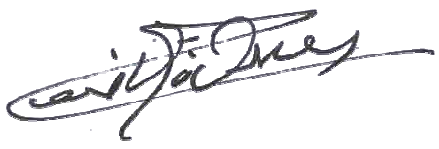
11. Requests and questions.

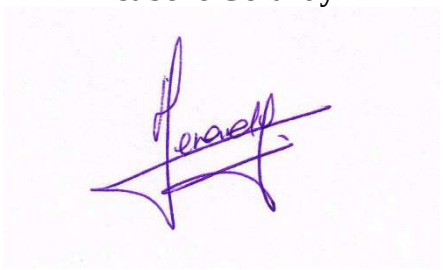
No other subject have to be discuss

And without other subjects to be discussed, the Secretary closed the Council on date and place ut supra.

Of all this, as Secretary I give faith.

Jose Rodenas **Isabelle Gerardy**





Annex: list of courses proposed for the academic year 2015-2016

Erasmus4All:	**Blended learning in radiation protection and radioecology**
Date of the project:	01/09/14-31/08/17
Place of the project:	CHERNE partner institutions
Coordinator (s)	Isabelle Gérardy (ISIB)
Other partners	academic: UHasselt, Aachen-Jülich, Bologna, Coimbra, Prague, Athens, Valencia research institute: National Radiation Protection Institute, Prague regulatory body, Greek Atomic Energy Commission
Status 2014-17:	not approved, not organized
Status 2015-17:	waiting for approval

****

IC:	**PRA: Probability Risk Assessment**
Date of the project:	26-30/01/2015
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s):	Sebastián Martorell
Status 2014-15	not organized, no interest from CHERNE partners
Status 2015-16	25-29/01/2016

****

IC:	**Neutron physics in the subcritical assembly**
Place of the project:	Aristotle University of Thessaloniki
Coordinator (s)	Stelios Stoulos
Status 2014-15:	not organized since the assembly is under reconstruction, to be ended in Sep 2015
Status 2015-16:	planned to be organized in 2015-16

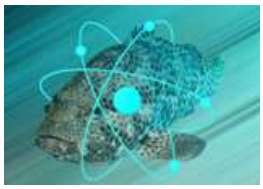
IC:	**Monte Carlo method applications to Laboratory, Industry and Medicine**
Date of the project:	15-17/02/2016 in Diepenbeek, maybe also in Jülich in December 2015
Place(s) of the project:	Diepenbeek (UHasselt) (and Jülich?)
Coordinator(s):	Wouter Schroeyers (UH), Isabelle Gérardy (ISIB)
Number of participants:	???
Status 2015-16:	discussed in a regional CHERNE meeting in UHasselt with ISIB and Jülich on 17/06/15

IC:	**III GEANT4 International School and Parallel Computing Concepts**
Date of the project:	9-13/11/2015
Place(s) of the project:	Università degli Studi di Catania
Coordinator(s):	Enzo Bellini
Number of participants:	max. 50
Status 2015-16:	Proposed in Minsk for CHERNE members

ANNEX 4

11th Workshop on European Collaboration for Higher Education and Research in Nuclear Engineering and Radiological Protection

CHERNE 2015



ROUND TABLE 1

Analysis and discussion on courses and programs proposed for CHERNE partners for next year

Moderator: Herwig Janssens

Topics discussed in RT1:

1. *CHERNE courses 2002-2014: Overview*
2. *CHERNE courses (proposed and organized) in 2014-15 – Proposals for 2015-16*
3. *CHERNE courses (proposed but not organized) in 2014-15 – Proposals for 2015-16*
4. *CHERNE courses: New initiatives and Proposals*
5. *Other partners - Reactions*
6. *Other partners*
7. *Remarks*

Annexes

1. *Template: Project Plan for CHERNE activities and other actions proposed to the network*
2. *Final Report on the 1st Intensive Course on Industrial Radiography – Athens-2014*

****

1. CHERNE courses 2002-2014: Overview

	Year	course	held in
1	2002	PAN-1	Prague
2	2003	PAN-2	Prague
3	2004	PAN-3	Mol-Brussels
4	2005	pre-SPERANSA	Praag
5	2006	SPERANSA-1	Mol-Jülich
6	2007	SPERANSA-2	Prague
7	2007	JUNCCS-1	Jülich

8	2007	RAPIX-NOCOS-1	Brussels-Diepenbeek
9	2008	SPERANSA-3	Mol-Brussels
10	2008	JUNCCS-2	Jülich
11	2008	RAPIX-NOCOS-2	Brussels-Diepenbeek
12	2009	ICARO-1	Lisbon
13	2009	JUNCCS-3	Jülich
14	2009	XIMER-1	Brussels-Diepenbeek
15	2010	ICARO-2	Palermo-Catania
16	2010	JUNCCS-4	Jülich
17	2010	MonteCarlo	Brussels
18	2011	XIMER-2	Brussels-Diepenbeek
19	2011	ICARO-3	Lisbon
20	2011	PRA	Valencia
21	2011	JUNCSS-5	Jülich
22	2012	XIMER-3	Brussels-Diepenbeek
23	2012	SARA-1	Mol-Jülich
24	2013	SARA-2	Prague
25	2013	XIMER-4	Brussels-Diepenbeek
26	2014	SARA-3	Brussels-Diepenbeek
27	2014	XIMER-5	Brussels-Diepenbeek
28	2014	MANTRA	Bologna-Catania
29	2014	RADAM	Jülich

2. CHERNE courses (proposed and organized) in 2014-15

- *Proposals for 2015-16*

IC:	**RADIOCHEMISTRY: Methods and applications in Radiochemistry**
Date of the project:	9 – 13 March 2015
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s):	José Ródenas
Other partners:	Ulrich Scherer, FH Aachen Campus Jülich (Germany)
Number of participants:	UPV (5), BSU (10)
Status 2015-16:	probably organized for UPV and can be open for CHERNE partners

****

IC:	**XIMER: Measurements of Environmental Radioactivity**
Date of the project:	March 16th to March 27th, 2015
Place(s) of the project:	Diepenbeek (UHasselt-NuTeC) and Brussels (ISIB), Belgium
Coordinator(s):	Caroline Licour (ISIB), Luc Lievens (UHasselt)
Number of participants:	UHasselt (7), ISIB (5), Bologna (1)
Status 2015-16:	will be organised again (discussed in a regional CHERNE meeting in UHasselt with ISIB and Jülich on 17/06/15) 11/04-22/04/2015

****

IC	**IC-RAD: Intensive Course on Industrial Radiography**
Date of the project:	September 29 -- October 3, 2014
Place of the project:	Nuclear Engineering Laboratory, School of Mechanical Engineering, National Technical University of Athens NTUA (Greece)
Coordinator (s)	Nick P. Petropoulos
Number of participants:	FH Aachen-Jülich (3)
Status 2015-16:	will be organized again *biannually* (next: 2016) see annex

****

IC:	**SARA: Safe Application of Radiation and radionuclides**
Date of the project:	30/03/15 – 03/04/15
Place of the project:	CVUT, Prague, Czech Republic
Coordinator (s)	Lenka Thinová (CVUT), Isabelle Gérardy (ISIB)
Other partners	AMSU Bologna, FH Aachen-Jülich, UHasselt, UP Valencia, US Catania, U Salamca
Number of participants:	AMSU Bologna (2), FH Aachen-Jülich (2), UHasselt (2), UP Valencia (3), US Catania (3), U Salamanca (2), CVUT Prague (3), ISIB Brussels (3), Athens (1)
Status 2015-16:	will probably be organised again in 2016, depending on budget and without flight reimbursement

****

IC:	**IMAGING: Formation, Acquisition and Processing of Images in Nuclear Medicine Techniques**
Date of the project:	4 – 8 May 2015
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s):	José Ródenas
Other partners:	Isabel Lopes, Universidade de Coimbra (Portugal)
Status 2014-15:	organized only for UPV students (5), no interest from CHERNE partners
Status 2015-16:	probably organized for UPV and can be open for CHERNE partners

****

IC:	**Soft Computing: An Introduction to Soft Computing Methods in Modern Engineering: Genetic Algorithms, Neural Networks and Fuzzy Logic**
Date of the project:	3 – 7 November 2014
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s)	José Ródenas, UPV
Other partners:	Enrico Zio, Politecnico de Milano (Italy)
Status 2014-15:	organized only for UPV students (11) , no interest from CHERNE partners
Status 2015-16:	organized for UPV and can be open for CHERNE partners 2-6/11/2015 or 9-13/11/2015

****

IC:	**NATURAL RADIOACTIVITY: Protection against Natural Ionizing Radiation**
Date of the project:	24 – 28 November 2014
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s):	José Ródenas, UPV
Other partners:	Isabelle Gerardy, Institut Supérieur Industriel de Bruxelles (ISIB, Belgium)
Status 2014-15:	organized only for UPV students (7), no interest from CHERNE partners
Status 2015-16:	organized for UPV and can be open for CHERNE partners 23-27/11/2017

****

IC:	**RADAM: Radiation Detection and Measurement**
Date of the project	Aug., 31st – Sep., 4th , 2015
Place(s) of the project	FH Aachen Campus Jülich
Coordinator(s)	Frieder Hoyler, FH Aachen Campus Jülich
Status 2014-15:	will be organised (Aug., 31st – Sep., 4th , 2015)
Number of participants:	???
Status 2015-16:	will be organised again (September 2016)

****

IC:	**MARC: Methods of Applied Radiochemistry**
Date of the project	Sep 7-11, 2015
Place(s) of the project	FH Aachen Campus Jülich
Coordinator(s)	Ulrich Scherer, FH Aachen Campus Jülich
Other partners	C. Licour, ISIB
Status 2014-15:	will be organised (Sep 7-11, 2015)
Number of participants:	FH Aachen-Jülich (5), ISIB Bruxelles (1), Brasil (5), other (3)
Status 2015-16:	will be organised again (September 2016)

****

Training School:	**Training School on Reuse of NORM in Building Materials**
Date of the project:	31/08/15-04/09/15
Place of the project:	Diepenbeek (UHasselt-NuTeC)
Coordinator (s)	Wouter Schroeyers,UHasselt
Other partners	Cost Action Network
Status 2014-15:	will be organized (31/08/15-04/09/15)
Status 2015-16:	to be discussed

****

Excursion:	**Grenoble-Tricastin-Marcoule-Cadarache**
Date of the project:	20-24/11/2014
Place(s) of the project:	France
Coordinator(s):	Frieder Hoyler, FH Aachen, Domiziano Mostacci, Unibo, Bologna
Number of participants:	Jülich (17), Bologna (28)
Status 2015-16:	under discussion

****

IC:	**WATER ISSUES AT NPP**
Date of the project:	10-20/02/2015
Place(s) of the project	Belarusian State University (Belarus)
Coordinator(s):	Tatsiana Savitskaya, BSU, Iryna Kimlenka, BSU
Other partners:	Dzmitry Hrynshpan, Research Institute for Physical and Chemical Problems, BSU
Status 2014-15	organized for BSU students only, Bologna showed interest, but not finalized
Status 2015-16	will be organized again

3. CHERNE courses (proposed but not organized) in 2014-15

- *Proposals for 2015-16*

Erasmus4All:	**Blended learning in radiation protection and radioecology**
Date of the project:	01/09/14-31/08/17
Place of the project:	CHERNE partner institutions
Coordinator (s)	Isabelle Gérardy (ISIB)
Other partners	academic: UHasselt, Aachen-Jülich, Bologna, Coimbra, Prague, Athens, Valencia research institute: National Radiation Protection Institute, Prague regulatory body, Greek Atomic Energy Commission
Status 2014-17:	not approved, not organized
Status 2015-17:	waiting for approval

****

IC:	**PRA: Probability Risk Assessment**
Date of the project:	26-30/01/2015
Place(s) of the project:	UPV – Valencia (Spain)
Coordinator(s):	Sebastián Martorell
Status 2014-15	not organized, no interest from CHERNE partners
Status 2015-16	25-29/01/2016

****

IC:	**Neutron physics in the subcritical assembly**
Place of the project:	Aristotle University of Thessaloniki
Coordinator (s)	Stelios Stoulos
Status 2014-15:	not organized since the assembly is under reconstruction, to be ended in Sep 2015
Status 2015-16:	planned to be organized in 2015-16

****

IC:	**Nuclear Analytical Techniques and Applications**
Place of the project:	Nuclear Engineering Department, National Technical University of Athens NTUA (Greece)
Coordinator (s)	Marios J. Anagnostakis
Other partners	National Center for Scientific Research Demokritos
Status 2014-15:	not organized
Status 2015-16:	not organized

****

4. CHERNE courses: New initiatives and proposals

IC:	**Monte Carlo method applications to Laboratory, Industry and Medicine**
Date of the project:	15-17/02/2016 in Diepenbeek, maybe also in Jülich in December 2015
Place(s) of the project:	Diepenbeek (UHasselt) (and Jülich?)
Coordinator(s):	Wouter Schroeyers (UH), Isabelle Gérardy (ISIB)
Number of participants:	???
Status 2015-16:	discussed in a regional CHERNE meeting in UHasselt with ISIB and Jülich on 17/06/15

IC:	**III GEANT4 International School and Parallel Computing Concepts**
Date of the project:	9-13/11/2015
Place(s) of the project:	Università degli Studi di Catania
Coordinator(s):	Enzo Bellini
Number of participants:	max. 50
Status 2015-16:	Proposed in Minsk for CHERNE members

5. Other partners - Reactions

- Instituto Superior Tecnico (IST), **Lisboa** (Portugal)
    1. Pedro Vaz: we do not intend/cannot organize or co-organize a CHERNE activity during next year
    2. maybe some engagement by José Marques (private communication with Pepe)
- Nuclear Engineering Department, Politecnico di **Milano** (Italia), Enrico Zio
    1. a little bit overwhelmed with activities and cannot organize anything also next year (except possibly the meeting in Milan, with Flavia Groppi).
- Universidad de **Salamanca** (Spain), Begoña Quintana
    1. some ideas around a school on gamma spectrometry, including experimental- and simulation-based procedures, measurement of natural radionuclides in a variety of matrices
- Facoltà d'Ingegneria, Alma Mater Studiorum - Università di **Bologna** (Italia), Domiziano Mostacci
    1. candidate for organizing the next CHERNE Workshop (together with Catania, and maybe Milano))
    2. candidate to organize a field trip (together with Frieder Hoyler)

6. Other partners

Associate Members

- Universidade de **Coimbra** (Portugal)
- Department of Nuclear Engineering, Università degli Studi di **Palermo** (Italia)

- Department of Physics, Università degli Studi di **Messina** (Italia)
- Escola Tècnica Superior d'Enginyeria Industrial (ETSII), UPC, **Barcelona** (Spain)
- Kansas State University (KSU), Manhattan, **Kansas** (USA)
- University of Cadi Ayyad, **Marrakech** (Morocco)

- Universidade da Beira Interior (UBI), **Covilhã** (Portugal). *Membership confirmed at the CHERNE Council.*
- Department of Physics, Università degli Studi di **Milano** (Italia). *Membership confirmed at the CHERNE Council.*

7. Remarks

- For the announcement of the next courses the CHERNE template 2015-16 should be used (see annex), to be included in the CHERNE Bulletin. François Tondeur has agreed to remain the Bulletin coordinator during 2015-16.
- This template should be filled in *before the beginning of September 2015* to allow the communication to the students at the beginning of the academic year (end of September) in the CHERNE Bulletin and should be send to:
  - François isib Tondeur (tondeur@isib.be)
  - Isabelle isib Gerardy (gerardy@isib.be)
  - Herwig tln Janssens (herwig.janssens@telenet.be)
- Well before the actual organisation of a course a separate second announcement should be send by the organisers to the partners.
- All further information concerning the projects will be distributed on the CHERNE Platform (platform coordinator: Marios Anagnostakis (managno@nuclear.ntua.gr), with cc to Isabelle Gerardy (gerardy@isib.be)

ANNEX 5

CHERNE 2015-16

Project Plan for CHERNE activities and other actions proposed to the network

Acronym/Short title of the project: xxx xxx

Time schedule for the proposal of educational activities for students (proposals not addressed to students may be introduced at any time)	before September 15: the organiser fills the present form and sends it to the secretary of CHERNE, Isabelle Gerardy gerardy@isib.be before September 30: received proposals are sent to all CHERNE partners by the CHERNE secretary and made available on the information platform
Context	This project plan is meant to inform CHERNE partners and their students about an activity organised in the framework of the CHERNE network, taking into account the objectives of CHERNE as described in the CHERNE declaration www.upv.es/cherne
Definitions	IC: Intensive course, at least 1 week/2 ECTS SP: strategic partnership (may include intensive programmes and other actions) IP: intensive programme, part of the actions of a SP

Title of the project and acronym (if applicable)	
Type of the project	Please fill in: SP, IP, IC, excursion, visit, internship, workshop, research, other?
Main objective of the project	Describe in a few lines the main objective of the project. Eventually an extensive description can be given in an annex
Short description of the project	
Expected learning outcomes (if applicable)	
Date of the project	
Place(s) of the project	
Coordinator(s)	Name, Institution, email
Contact person (if different)	Name, Institution, email
Other partners	Name, Institution
Is the partnership still open to more partners?	open / closed
Intended participants Expected present studying level of participants and their specialisation (if	students (Ba, Ma, PhD?), staff members, external, …? the activity is organised for the own students, free places are open for students of CHERNE partners / or: the activity is organised for students of all CHERNE partners / or:

relevant)	the activity is organised for …/…
Prerequisites **Expected initial knowledge**	
Intended or maximal number of participants	
Task force (if applicable)	Name, Institution
Working method, time schedule and deadlines for the organisation and for the task force	Make clear here which kind of answer is expected from CHERNE members to this proposal and when.
Evaluation **(of participants, by participants, by organisers, …)**	
Reporting and dissemination (if applicable)	
Is the project part of an Erasmus program?	
ECTS or ECVET credits applicable? How many?	
Are any other industrial or research non CHERNE partners involved?	Name, Institution
Terminology	CHERNE: Cooperation for Higher Education on Radiological and Nuclear Engineering other: …/…
Practical organisation	Accommodation : organised / not organised
Costs for the students (if applicable)	Travel : covered / not covered Accommodation Social events Tuition fee **TOTAL FEE**
Extra information or conditions	…/…
Anything else	…/…

Annex 1
…/…
Annex 2
…/…

ANNEX 6

ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

ΣΧΟΛΗ ΜΗΧΑΝΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ
ΤΟΜΕΑΣ ΠΥΡΗΝΙΚΗΣ ΤΕΧΝΟΛΟΓΙΑΣ

***ΕΠΙΚ. ΚΑΘΗΓΗΤΗΣ* Ν.Π. ΠΕΤΡΟΠΟΥΛΟΣ**
Δρ. Μηχανολόγος Μηχανικός ΕΜΠ

NATIONAL TECHNICAL UNIVERSITY OF ATHENS
SCHOOL OF MECHANICAL ENGINEERING
DEPARTMENT OF NUCLEAR ENGINEERING

***ASSIST. PROFESSOR* N.P. PETROPOULOS**
Dipl. Eng. NTUA, Ph.D. NTUA

Professor José Ródenas,

Universidad Politécnica de Valencia (UPV)
Departamento de Ingeniería Química y Nuclear (DIQN), Valencia (Spain),

Athens, May 28, 2015

Re: Final Report for the 1st Intensive Course on Industrial Radiography

Dear Professor Ródenas,

Let me please provide herewith an accounting report of the 1st Intensive Course on Industrial Radiography (IC-IRAD), which was successfully held between Sep 29 and Oct 3, 2015, at the Nuclear Engineering Department of the National Technical University of Athens (NED-NTUA). As well known, the course was an joint initiative of NED-NTUA and the CHERNE network. Detailed data on this course have been also made available at the course web site, which has been specifically prepared for the course purposes, at the following link:

https://sites.google.com/site/ntuaradiographycource/

1. Course history, aim and generic particulars

The aim of this one-week intensive course is to bring together students and teaching staff from higher education institutions involved in the nuclear engineering applications fields, for a 5 continuous full day (09.00-17.00) course regarding the principles of conventional (film) industrial radiography and associated radiation protection.

The usefulness of an intensive course on industrial radiography, either with or without ERASMUS or other funding support, were proposed by the Nuclear Engineering Department of the National Technical University of Athens (NED-NTUA) during the 8th CHERNE Workshop, which was hosted by NED-NTUA in GREECE, between 28 to 30 May 2012.

A second detailed discussion on the matter was further held during the 9th CHERNE Workshop, which was hosted by the Faculty of Sciences at the University of Salamanca, SPAIN, between 5 to 7 June 2013. Following these discussions, it was finally decided that such a course could be organized for the first time not later than Autumn 2014 under the name IC-IRAD and for the duration of one week only.

2. Particulars of the 1st course

The course was not funded by any external source and, therefore, it was run using the personnel, the facilities and the equipment available at NED-NTUA. Registered participants were not supported financially, in any way i.e. for transportation, accommodation, per-Diem etc. It has been decided that despite the luck of funding to charge no fees to the course participants.

15780 ΑΘΗΝΑ • 15780 ATHENS, GREECE ☎ (+30) 210-7722939 🖷 (+30) 210-7722914
✉ npetr@central.ntua.gr • npetro@nuclear.ntua.gr 🖳 http://nuclear.ntua.gr

The course was held for three students coming from FH Aachen, who were registered in June 2014. All lectures were given in English (the official course language). All participants received adequate course material mainly in printed form and also electronic copies of suggested studying material.

Since the level of the attending participants was sufficiently high it was decided that there was no need for an oral or written examination. Course duration and content could be unofficially considered as equivalent to 2 ECTS, nevertheless there was no official provision for ECTS or ECVET credits, since the credit system has not been yet adopted in our University for such provisional seminars.

A duly signed certificate of attendance was issued for all course participants.

Rest of the characteristics of the given lectures program and course conduct specifics may be found at the link of the course web site.

3. Course equipment and facilities

Here is a basic list of the main equipment and facilities which were available for the course:

a. X-Ray Source type ERESCO MF42 (200 kV) by GE Inspection and Sensing Technologies

b. NOVA (Agfa) Film Processor Type: 7070/100 by GE Inspection and Sensing Technologies

c. 4X Film Viewer 205x85 mm for Welding Film by Kowolux

d. Digit-X Densitometer by Fidgeon Ltd

e. Scanjet G4050 by Hewlett Packard]

f. Image quality indicators (after DIN), lead letters and numbers, densitometer calibration film, spatial resolution specimens

In addition:

The was provided an independent and adequate classroom with all necessary audio visual means.

4. Course evaluation

An evaluation of the course was held in the form of discussion during the last day. The summary conclusions are listed below coming from both the participants and the instructor:

- The course was taught by a sole instructor only. It would be advisable that more instructors should be involved in future courses.
- The time available for the course seems limited; participants expressed their suggestion of more laboratory work like radiography of random specimens provided by the participants themselves, further laboratory investigation of the penumbra effects etc.
- Participants expressed their suggestion to include radiography simulation and digital radiography in the course program.
- Participants felt that a second free afternoon would let them know Athens better.
- Participants would like to receive more information about the National Technical University of Athens and possibly visit one or two other Laboratories of the School of Mechanical Engineering according to their interests.
- The logistics of the course were quite satisfactory (web site, accommodation instructions, visa and health insurance info, Wi-Fi services, registration procedure, location, transportation means, bar and restaurant facilities, availability of the instructor for non-course guidance etc.)