

HORIZON 2020
RESEARCH INFRASTRUCTURES

H2020-INFRAIA-2014-2015

INFRAIA-1-2014-2015 INTEGRATING AND OPENING EXISTING NATIONAL AND REGIONAL RESEARCH
INFRASTRUCTURES OF EUROPEAN INTEREST



ENSAR2
EUROPEAN NUCLEAR SCIENCE AND APPLICATION RESEARCH 2

GRANT AGREEMENT NUMBER: 654002

DELIVERABLE D8.6 –
NUPIA – REPORT ON THE SURVEY OF AVAILABLE COURSES IN EUROPEAN COUNTRIES

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| | Contributors: | |
| | Reviewed by: | Adam Maj |
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TABLE OF CONTENTS

| | |
|--|----|
| HORIZON 2020..... | 1 |
| Research Infrastructures | 1 |
| H2020-INFRAIA-2014-2015..... | 1 |
| INFRAIA-1-2014-2015 Integrating and opening existing national and regional research infrastructures of European interest | 1 |
| ENSAR2 | 1 |
| European Nuclear Science and Application Research 2 | 1 |
| Grant Agreement Number: 654002..... | 1 |
| deliverable D8.6 – | 1 |
| NuPIA – report on the survey of available courses in European countries..... | 1 |
| Project and Deliverable Information Sheet | 2 |
| Document Control Sheet | 2 |
| Document Status Sheet | 2 |
| Table of Contents..... | 4 |
| List of Figures..... | 4 |
| References and applicable documents..... | 4 |
| List of acronyms and abbreviations..... | 5 |
| Executive Summary | 6 |
| Introduction..... | 6 |
| Courses provided by ensar2 partners..... | 6 |
| Other courses available within europe..... | 9 |
| Testing | 9 |
| Conclusion | 9 |
| Annex..... | 10 |

*LIST OF FIGURES**REFERENCES AND APPLICABLE DOCUMENTS*

[1]

LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-------------|---|
| GANIL | GRAND ACCELERATEUR NATIONAL D'IONS LOURDS |
| GANIL | |
| INFN | ISTITUTO NAZIONALE DI FISICA NUCLEARE |
| CERN | EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH |
| JYU | JYVASKYLAN YLIOPISTO |
| CNRS | CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE |
| GSI | GSI HELMHOLTZZENTRUM FUER SCHWERIONENFORSCHUNG GmbH |
| RUG | RIJKSUNIVERSITEIT GRONINGEN |
| IFJ PAN | THE HENRYK NIEWODNICZANSKI INSTITUTE OF NUCLEAR PHYSICS, POLISH ACADEMY OF SCIENCES |
| UNIWARSAW | UNIwersytet Warszawski |
| IFIN-HH | INSTITUTUL NATIONAL DE CERCETARE -DEZVOLTARE PENTRU FIZICA SI INGINERIE NUCLEARA "HORIA HULUBEI |
| EBG | Entwicklungs- und Betriebsgesellschaft) MedAustron GmbH (EBG MedAustron) GMBH |
| KU Leuven | KATHOLIEKE UNIVERSITEIT LEUVEN |
| ULB | UNIVERSITE LIBRE DE BRUXELLES |
| CEA | COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES |
| GIP ARRONAX | GROUPEMENT INTERET PUBLIC ARRONAX |
| JLU | JUSTUS-LIEBIG-UNIVERSITAET GIESSEN |
| JGU Mainz | JOHANNES GUTENBERG UNIVERSITAET MAINZ |
| LMU | LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN |
| UCO | UNIVERSITAET ZU KOELN |
| NCSR D | NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS" |
| UMIL | UNIVERSITA DEGLI STUDI DI MILANO |
| FFCUL | FUNDACAO DA FACULDADE DE CIENCIAS DA LISBOA UNIVERSISADE DE LISBOA |
| CIEMAT | CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS-CIEMAT |
| CSIC | AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS |
| USC | UNIVERSIDAD DE SANTIAGO DE COMPOSTELA |
| USE | UNIVERSIDAD DE SEVILLA |
| ULIV | THE UNIVERSITY OF LIVERPOOL |
| UoY | UNIVERSITY OF YORK |
| ATOMKI-HAS | Magyar Tudományos Akadémia Atommagkutató Intézete |

EXECUTIVE SUMMARY

INTRODUCTION

The aim of this survey was to ascertain that training already was in place within the ENSAR2 partner institutes and more generally within the partner countries.

The survey was sent to the ENSAR2 partner institutes, which are listed in the table of acronyms above. The plans for the training provided by NUPIA were presented and the following questions were posed:

- Please could you send me a list of training courses that you provide for industry at your institutes?
- Please inform me of any nuclear training for industry within the country where you presently reside.
- If you feel that something is missing from this list [of proposed courses], which you would be willing to provide, then please contact me to discuss this possibility.

In addition, it was stated that after the deadline for responses it shall be assumed that there is no training at your institutes.

The results of these questions are presented in the following sections and then conclusions are drawn.

COURSES PROVIDED BY ENSAR2 PARTNERS

The institutes who responded to the survey were: KU Leuven, LMU, USE, INFN-LNL, IFIN-HH, GANIL, IFJ-PAN, UNIWARSAW, GSI, CIEMAT, ULIV, FFCUL, CIEMAT and JYU.

The responses of the institutes are given below.

KU LEUVEN:

In Belgium, there is the Belgian Nuclear Higher Education Network, BNEN, which offers a professional master's programme in nuclear technology.

More information can be found at the following website: <http://bnen.sckcen.be/>

KU Leuven is member of BNEN, through its faculty of engineering (IKS belongs to the faculty of science).

There is also the Radiation Medicine Professional Master programme (Ma-na-Ma).

It is a 1-year full-time-equivalent programme open for people who already hold a Master's degree.

More information can be found at the following link:

https://onderwijsaanbod.kuleuven.be/opleidingen/n/CQ_50268906.htm#activetab=diploma_omschrijving

This programme is only available in Dutch.

Both these courses can be taken as part-time courses whilst working, but you can only sign up for the whole Master's programme not individual courses.

LMU MUNICH:

No such training is available.

USE:

Provides post-graduate courses, in IBA techniques, applied nuclear physics, etc., which are not specially aimed for industries, but which would, of course, gladly accept participants from industries.

INFN-LNL:

There are no courses for industry at the moment.

IFIN-HH:

It has as a department dedicated to the training of personnel working with radiation, radioactive products or installations producing ionising radiation. It gives certificates for work with such devices.

Training Courses provided by Nuclear Training Centre (CPSDN) within “Horia Hulubei” National Institute for Physics and Nuclear Engineering (IFIN-HH in Bucharest-Magurele, Romania) are:

- Radiation protection for nuclear gauges
- Radiological safety in non-destructive testing
- Radiation protection for particles accelerators
- Radiation protection in medical applications (Nuclear Medicine, Radiotherapy, Diagnostic and Intervention Radiology)
- Radiation safety in mining and processing of uranium and thorium ores
- Training for CBRN personnel (Radiological and Nuclear Emergency)
- Nuclear radiation measurements (alpha, beta, gamma spectrometry)
- Decommissioning of nuclear facilities (VVR-S Reactor)

GANIL:

Does not provide any specific course for industrial companies (except when they come to do some work on site and they are given a short course on radioprotection).

The organisation NUCLEOPOLIS (<http://nucleopolis.com/?q=content/portail-formation>) can organise nuclear courses (in the very large sense) for industries. This organisation deals with applications of Nuclear Physics for Energy and Health.

IFJ-PAN AND UNIWARSAW:

As there were starting efforts to build and run a nuclear power plant in Poland, it was assumed that was particularly important to educate engineers of nuclear power. To answer the request of technological companies involved in the process of preparation of the nuclear energy programme in Poland, the Heavy Ion Laboratory prepared a programme of multi-day diagnostic and training workshops. The workshop was design to carry out practical activities, including demonstrations and tasks to be performed by participants in key areas of implementation of nuclear technologies.

The programme was focused on the following issues: registration and properties of ionising radiation, absorption of ionising radiation, decays of atomic nuclei, absorption of radionuclides by living organisms and nuclear reactions.

Practical exercises were supplemented by lectures presenting the basic issues related to the detection of ionising radiation and dosimetry, as well as applications of nuclear technology in energy and medicine.

The workshop was held in March, 2014 - it was organised in the frame of the scientific project. Ten employees and university students working for the chemical companies involved in the Polish nuclear energy programme participated.

The offer of workshop can be addressed to enterprises implementing the nuclear technologies in nuclear medicine, smoke sensors service and space industry too.

Since 2014 the courses have been repeated due to lack of financial resources and the suspension of Polish nuclear energy programme.

CIEMAT:

Of the courses given, only one course is open to people from industry. Furthermore, if a company asks for a specific course which is not in the list, CIEMAT evaluates its feasibility (asks its internal experts), estimates its cost and if the answer is positive, it is organised.

The courses are concentrated in time from 16 to 30 hours and are typically concentrated in one week. A total of 16 courses directly related to Nuclear Physics are offered. More information can be found from

<http://www.ciemat.es/>

JYFL:

In the past, JYFL has not opened its courses to industry. Through NUPIA we will offer 3 one-week courses based on:

Materials characterisation with ion beams

The effects of radiation on electronics component

The interaction of radiation with matter and radiation detection techniques.

LIVERPOOL:

A one-year full-time taught MSc programme (or up to six years part-time) is offered. Full courses details can be found from the following link, <https://www.liverpool.ac.uk/study/postgraduate/taught/radiometrics-instruction-and-modelling-msc/overview/>

It is also possible to participate in single courses. Through NUPIA, 6 of these courses will be offered to industry. They are:

Principles of Radiation Detection
High-Resolution Gamma Spectrometry
Radiation Shielding -MCNP modelling
Nuclear Instrumentation
Neutrons: Detection and Modelling
Radiation Protection and Dosimetry.

GSI:

Does not provide any training.

FFCUL:

At present, there are no courses on nuclear techniques for industry.

ENSAR2 WHO DID NOT RESPOND TO THE SURVEY:

CERN, CNRS, RUG-KVI, EBG, ULB, CEA, GIPARRONAX, JLU, JGU-Mainz, UCO, NCSR, UMIL, CSIC, USC and UoY.

OTHER COURSES AVAILABLE WITHIN EUROPE

A summary of available training in Europe can be found through the following link, <https://www.euronuclear.org/1-education-training/> .

SUMMARY

Nuclear training for Industry exists at some level across EU countries. What is clear from this survey is that there is need for stronger networking ties between ENSAR2 partners and also between research institutes and industry in order to give a clear picture to Industrial partners what training exists.

Annex