

The European Nuclear Education

Network Association

ENEN



Peter P. De Regge, Secretary General
On behalf of the ENEN Association

STARTING POINT

The Lisbon 2000 summit proposed the strategic goal for the European Union to become the most competitive knowledge-based economy with more and better employment and social cohesion by 2010.

&

“Although the number of nuclear scientists and technologists may appear to be sufficient today in some countries, there are indicators that future expertise is at risk.

In most countries, there are now fewer comprehensive, high quality nuclear technology programmes at universities than before.

The ability of universities to attract top quality students, meet future staffing requirements of the nuclear industry, and conduct leading-edge research is becoming seriously compromised”.

Quotation taken from

- “Reflection Paper” prepared in 2000 by the CCE-FISSION Working Group on Nuclear Education, Training and Competence.
- “Nuclear Education and Training: Cause for Concern?” OECD / Nuclear Energy Agency, ISBN 92-64-18521-6.



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HISTORY and DEVELOPMENT



- 5th Framework EC programme, January 2002

The “European Nuclear Engineering Network” project:

- establishes the basis for conserving nuclear knowledge and expertise
 - creates a European Higher Education Area for nuclear disciplines
 - initiates the implementation of the Bologna declaration in the nuclear disciplines
 - Deliverables and results at <http://www.sckcen.be/enen/>
- The European Higher Education Area is formalised by creating the European Nuclear Education Network, the “ENEN” Association under the French law of 1901, on 22 September 2003

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ENEN GENERAL GOALS



Towards the Universities

- To develop a more harmonised approach for education in the nuclear sciences and engineering in Europe.
- To integrate European education and training in nuclear safety and radiation protection
- To achieve a better cooperation and sharing of resources and capabilities at the national and international level

Towards the End-users (industries, regulatory bodies, applications)

- To create a secure basis of skills and knowledge of value to the EU
- To maintain an adequate supply of qualified human resources for design, construction, operation and maintenance of nuclear infrastructures and plants
- To maintain the necessary competence and expertise for the continued safe use of nuclear energy and applications of radiation in industry and medicine.

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ENEN Mission and First Objectives



■ MISSION

the preservation and further development of higher nuclear education and expertise

■ OBJECTIVES

- ⇒ to deliver a certification of European Master of Science in Nuclear Engineering
- ⇒ to encourage and support PhD studies
- ⇒ to promote exchange of students and teachers participating in the European Nuclear Education Network
- ⇒ to establish a framework for mutual recognition
- ⇒ to foster and strengthen relations between universities, nuclear research laboratories, industries and regulatory bodies
- ⇒ To ensure the quality of nuclear engineering academic education, training and research,
- ⇒ To create incentives and increase career attractiveness for the enrolment of students and young academics in nuclear disciplines

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Actions towards the Universities



➤ Assist universities to attract young and brilliant students by

- identifying, developing and disseminating new and challenging subjects for research
- establishing links and cooperation with research centres

➤ Convince universities to recruit new academic members for teaching and research in nuclear disciplines and maintaining expertise in key nuclear areas by

- developing, promoting and supporting ENEN exchange courses in nuclear disciplines
- disseminating and supporting the concept of life long learning in nuclear disciplines
- facilitate and coordinate the participation of universities to European research projects

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Actions towards the End users

- Conserve the nuclear knowledge and improve the expertise by developing and establishing databases, web sites and distance learning tools
- Define the goals and set up the criteria for professional recognition and recruitment throughout the EU
- Provide resources and lecturers for advanced training courses, professional upgrades and continual training programmes
- Identify, disseminate and support interesting projects and research topics for internships, master theses and PhDs



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ENEN Members

- **Effective members**
 - have a legal status in an EU country or a candidate EU member country
 - provide high level scientific education in the nuclear field, as full time teaching or in combination with research work
 - use selective admission criteria
- **Associated members**
 - have a legal status in an EU country or a candidate EU member country
 - have a long term tradition of relations with effective members in the field of research, training or education
 - commit themselves to support the ENEN Association



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ENEN Structure



General Assembly Board of Directors (Governing Board)				
(Management Committee)		Secretary General		
Chairman Committee 1	Chairman Committee 2	Chairman Committee 3	Chairman Committee 4	Chairman Committee 5
Teaching & Academic Affairs Committee	Advanced Courses & Research Committee	Training and Industrial Projects Committee	Quality Assurance Committee	Knowledge Management Committee
3*+2**	3*+2**	2*+3**	3*+2**	3*+2**

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FIVE ENEN COMMITTEES(1)



Teaching and Academic Affairs Committee :

- Katholieke Universiteit Leuven – Chair (B)
- Ecole Polytechnique Fédérale de Lausanne (CH)
- Universitatea Politehnica București (RO)
- Institute for Safety and Reliability (D)
- HMS Sultan (UK)
- Univerza v Ljubljani (SI)

Objectives and tasks: Dissemination of Knowledge

- Awarding the European Master of Science in Nuclear Engineering certification;
- Promoting student and faculty exchange by encouraging and supporting the organisation of international exchange courses by ENEN members;
- Promoting the harmonisation of nuclear engineering curricula throughout Europe;
- Supporting the organisation of high-quality nuclear engineering courses by ENEN members;
- Awarding the International ENEN Course label, in collaboration with the ENEN Quality Assurance Committee

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EMSNE Flyer



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EMSNE

philosophy

The objectives of the European Master of Science in Nuclear Engineering Framework are:

- to educate students towards analytic, resourceful and inventive nuclear engineers by combining the joint state-of-the-art know-how of the participating universities;
- to train these students by making full use of the unique nuclear research and industrial facilities throughout Europe;
- to develop a common safety culture throughout Europe;
- to develop an international network of nuclear engineers and scientists by participation of students of different nationalities, by contact and collaboration with local students, and by education in several countries with different educational views, different nuclear reactor concept and technologies, and different nuclear policies.

assuring quality

The European Master of Science in Nuclear Engineering Certification is acknowledged to students who have obtained a master degree in nuclear engineering, or equivalent, that meets the objectives and quality standards set by the ENEN Association. This certification is a guarantee that the master education received was of the highest quality in Europe.

application

All application info can be found at the website of the ENEN Association or contact your local ENEN representative.



www.enen-assoc.org

european nuclear education

nuclear know-how in Europe

The most familiar nuclear engineering application is the production of electricity by means of nuclear power. Over 30% of electricity production in the EU is provided by nuclear power. Moreover, Europe has developed a wide range of nuclear technologies and activities: power plants, fuel production, radioelement production, engineering, accelerator design and fabrication, waste management, safety management, nuclear medicine, research and... higher education.

European Nuclear Education Network

The European Nuclear Education Network (ENEN) is an international non-profit association of European universities and research centres, combining their knowledge and experience in nuclear education. Its mission is to further develop higher nuclear education and expertise in Europe. The ENEN Association acknowledges a European Master of Science in Nuclear Engineering Certification, encourages PhD studies in the nuclear field, promotes the exchange of teachers and students among its members, fosters the relations between universities and research centres, sets standards for the quality of academic nuclear engineering education, training and research.

contact

ENEN Association

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www.enen-assoc.org



European Master of
Science in Nuclear
Engineering
ENEN Certification

Nuclear Education by
the European Nuclear Education Network



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European Master of Science in Nuclear Engineering



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Undergraduate Engineering Study (years)	ENG 3y	ENG 4y	ENG 5y	ENG 5y**
Engineering (nuclear / non nuclear)	any	any	non nuclear	nuclear
Years to complete (typically)	3	4	5	5
ECTS accumulated to complete	180	240	300	300
EMNE	ECTS	ECTS	ECTS	ECTS
1 non nuclear basic (24-30 ECTS)	6	0	0	0
2	6	0	0	0
3	6	0	0	0
4	6	0	0	0
5	0	0	0	0
6 non nuclear advanced (24-30 ECTS)	6	6	0	6
7	6	6	0	0
8	6	6	0	0
9	6	6	0	0
10			0	0
1 nuclear core - preferred/substitute (24-36 ECTS)	6	6	6	0
2	6	6	6	0
3	6	6	6	0
4	6	6	6	0
5				0
6				0
7 nuclear core laboratory - pref./subs.(6-12 ECTS)	6	6	6	6
8				
9 nuclear electives - advanced/spec. (12-18 ECTS)	6	6	6	6
10	6	6	6	
11				
1 thesis (12-24ECTS)	12	12	12	0*
fixed	102	78	54	18
variable	18	12	6	12
collected at a partner institution abroad (30 ECTS)	30	30	30	12**
EMNE ECTS	120	90	60	30
total ECTS to EMNE	300	330	360	330

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EMSNE Nuclear Core Courses



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Preferred Nuclear Core Courses	ECTS
Introduction to Reactor Engineering	6
Reactor Physics	6
Nuclear Thermal Hydraulics	6
Safety and Reliability of Nuclear Facilities	6
Reactor Engineering Materials	6
Radiology and Radiation Protection	6
Preferred Nuclear Core Laboratory Course	ECTS
Nuclear Reactor Engineering Laboratory	6

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EMSNE Substitute Core Courses



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Substitute Nuclear Core Courses	ECTS
Nuclear Facilities Environmental Impact	6
Nuclear Fuel Cycle	6
Structural Mechanics – Nuclear	6
Nuclear Power Plant Technology	6
Fluid Mechanics	6
Reactor Control and Instrumentation	6
Nuclear Waste Processing and Disposal	6
Reactor Kinetics	6
Substitute Nuclear Core Laboratory Courses	ECTS
Nuclear and Radiation Physics Laboratory	6
Plant Simulation Laboratory	6

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EMSNE Related Documents

ENEN Web site <http://www.enen-assoc.org>

- EMSNE Flyer
- EMSNE Application Forms
- EMSNE Bylaws
- Assessment Guidelines for evaluating Applications

First series of applications received in 2005

3 certificates will be delivered at ENC 2005 to students/young professionals of Romania and France

International Exchange Courses

ID	Course Name	Organisation	Domain	Theory	Training	Advanced
1	Eugene Wigner Training Course for Reactor Physics Experiments	BME et al.	2			
2	Nuclear Thermal Hydraulics	BNEN	3			
3	Nuclear Reactor Theory	BNEN	2			
4	Radiation Protection and Nuclear Measurements	BNEN	6			
5	International Seminar on the Nuclear Fuel Cycle	INSTN	7			
6	Training Course on Nuclear Safety	INSTN	4			
7	Nuclear Reactors Systems	INSTN	1			
8	Safeguards: Non-proliferation of Nuclear weapons	BNEN	8			
9	Radioisotopes: Iodine 131 Production in an International Context	BNEN	8			
10	Accelerators and time of flight experiments	BNEN	8			

Confirmed ENEN Exchange Courses

ID	Course Name	Organisation	Domain	Theory	Training	Advanced
a	Master Thesis Project : HMS Sultan	HMS	MT			
b	Master Thesis Project : Technische Universität München	TUM	MT			
c	Master Thesis Project : University Politehnica Bucharest	UPB	MT			
d	Master Thesis Project : Technical University of Sofia	TUS	MT			
e	Master Thesis Project : Slovak University of Technology Bratislava	STUBA	MT			

Master Thesis Projects

International Exchange Courses

ID	Course Name	Organisation	Domain	Theory	Training	Advanced
A	Neutronics	EPFL	2			
B	Radiological Protection	UM	6			
C	Use of Accelerated Ions	UL	8			
D	Safety and Reliability of Nuclear Facilities	UL	4			
E	Reactor Physics Experiments	UL	2			
F	Nuclear Safety and Plant Simulation	TUM	4			
G	Nuclear Reactor Physics	CIRTEN	2			
H	Radiation Protection	CIRTEN	6			
I	Nuclear Power Plant Safety	CIRTEN	4			
J	Fusion Reactor Engineering	CIRTEN	8			
K	Structural Mechanics	CIRTEN	1			
L	Fluid Mechanics	CIRTEN	3			
M	Mathematical methods for Nuclear reactors	CIRTEN	2			
N	Introduction to Reactor Engineering	CIRTEN	1			
O	Back-End of the Nuclear Fuel Cycle	UU	7			
P	Introduction to Particle Accelerator Physics and Technology	STUBA	8			
Q	Nuclear Safety	STUBA	4			
R	Reactor Dynamics and Kinetics	TUD	2			
S	Extension to Eugene Wigner Course	UUV	2			
T	Practical Course on reactor Physics and Kinetics	ATI	2			
U	Practical Course on reactor Instrumentation	ATI	2			
V	G. de Hevesy Course for Radioanalytical Chemistry	BME	8			
W	Instrumentation and Control in Nuclear Reactors	BME	2			

Proposed ENEN Exchange Courses

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ENEN Exchange Course Related Documents

NEPTUNO Web site

<http://www.sckcen.be/neptuno/deliverables>

and

<http://www.neptuno-cs.de>

- Overview of ENEN International Exchange Courses
- Best Practices for International ENEN Exchange Courses
 - Do-it-yourself-kit
 - Flyers
 - Application Forms

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FIVE ENEN COMMITTEES(2)



Advanced Courses and Research Committee

- Universidad Politecnica de Madrid – Chair (E)
- Kungl Tekniska Högskolan Stockholm (SW)
- HMS Sultan (UK)
- Studiecentrum voor Kernenergie SCKCEN (B)
- Consortium Interuniversitario CIRTEN (I)

Objectives and Tasks:

Production and Dissemination of Knowledge

- Ensure the link between ENEN members and research laboratories in the European Community
- Identify and disseminate topics for internships, master theses and PhDs
- Encourage and support student mobility
- Define, design and organise advanced courses for students, PhD candidates and young professionals

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ENEN Advanced Courses



Topics identified as the result of a questionnaire on needs

- Scaling and Uncertainty in System Thermal Hydraulics.
- Coupled 3D Neutron Kinetics and Thermal Hydraulics and Application to Nuclear Reactor Theory.
- System Thermal Hydraulic Code Assessment and Code User Training and Qualification.
- Natural Circulation in Existing Reactors and Innovative Reactor Concepts.
- Radiological Protection.
- Safety Aspects of WWER Operation.
- Eugene Wigner extension. Experimental Training in Reactor Physics on LW critical Assembly.
- MSc Design Study (Project).
- Reactor Physics for Accelerator Driven Systems.
- Nuclear Fusion Technology.
- International Course on Advanced Thermal Hydraulic
- Advanced Course on Pressure Vessel Aging

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ENEN Advanced Courses

Example

Lecture programme

The main objectives of the course are to provide the student with a thorough understanding of time-dependent phenomena in nuclear reactors. In more detail, the lectures comprise:

- Review of reactor physics, delayed neutrons, emission spectra.
- Review of adjoint operators and functions.
- The basic concepts of intuitive point kinetics.
- The reactor eigenvalue problem and perturbation theory.
- The exact point kinetics equations.
- Kinetics for small and large time scales
- Transients with constant reactivity.
- Approximate point kinetics.
- Measurements methods of static and dynamic reactivity.
- Dynamics with prompt reactivity feedback.
- Space-energy dependent dynamics.

The following book, which will be distributed on the first day of the course, will be used as a reference: K.O. Oz and R.J. Neuhold, "Introductory Nuclear Reactor Dynamics", ANS, 1985. The costs are about 60 euro and can be paid in cash the first day.

Training programme

Training is foreseen at the following facilities of the Reactor Institute Delft:

- The RESIDEL software simulator (See www.ir.tudelft.nl/~rhw click FACILITIES and RESIDEL). Training includes the determination of the differential and integral reactivity worth of control rods and of the Xenon effect. (See www.ir.tudelft.nl/~krooster and www.ir.tudelft.nl/~haaijke@gh.delft.nl). Training includes the "approach to critical" and "hourly" experiments.
- The Hoger Onderwijs Reactor (HOR) of the Reactor Institute Delft. Training includes the determination of the differential and integral reactivity worth of control rods, and start-up experiments.

Course credits

At the end of the two-week course, the student is expected to study at home for one to two weeks after which the examination homework problems have to be made. The total credit for the course is 9 ECTS. The course will be held from **May 23 till June 3**, and the written examination is foreseen on **June 17, 2005**, from 9:00 till 12:00 hours at the home university.

Lecturers

The course will be given by Prof. dr. T.H.J.J. van der Hagen, dr. J.E. Hoogenboom, dr. J.L. Kloosterman and dr. D. Lathouwers.

Prof. Tim van der Hagen is a full professor of reactor physics at Delft University of Technology and director of the Reactor Institute Delft.

Dr. Eduard Hoogenboom is an associate professor at Delft University of Technology. He has 35 years experience in theoretical, computational and experimental reactor physics. His current interests are advanced Monte Carlo computation techniques.

Dr. Jan Leen Kloosterman is an associate professor at Delft University of Technology in the field of reactor physics. His background includes research in the field of recycling and transmutation of actinides and fission products, and reactor physics and dynamics of innovative nuclear reactor systems.

Dr. Danny Lathouwers is an assistant professor at Delft University of Technology in the field of reactor physics. His main interests include modal analysis, high-temperature reactors and coupled Monte-Carlo computations.

COURSE ON KINETICS AND DYNAMICS OF NUCLEAR REACTORS

Delft University of Technology



TU Delft



Delft University of Technology

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IP EUROTRANS

Objective

Design and feasibility assessment of an industrial prototype Accelerator Driven System (ADS) dedicated to transmutation, together with the definition of a design backup solution, to perform

Nuclear Incineration of Long-lived Radioisotopes
after their partitioning from high level waste streams.

Budget 2005-2008 (EC Contribution)

Total	23 Mio €
Education and Training	1.8 Mio €

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ENEN in IP EUROTRANS

- 17 EU Universities participate to IP EUROTRANS through the ENEN Association
- the ENEN Association
 - Represents them at the EUROTRANS Coordination Committee and other governing bodies
 - Facilitates interaction and cooperation between research scientists and PhD students
 - Organises 10 specialised (advanced) courses on project related topics, involving lectures, scientific visits, joint experiments, and training sessions
- Requirements
 - Universities are full ENEN Members



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Universities represented by ENEN in IP EUROTRANS

- Party P13.1: AGH Krakow, University of Science and Technology, Poland,
- Party P13.2: TUW, Vienna University of Technology, Austria,
- Party P13.3: CIRTEN, Inter University Consortium for Nuclear Technological Research, Italy,
- Party P13.4: IAP-FU Frankfurt, J.W. Goethe-Universität, Germany,
- Party P13.5: IQS, Institut Quimic de Sarria, Spain,
- Party P13.6: KTH Stockholm, Kungl Tekniska Högskolan, Sweden,
- Party P13.7: RUB-LEE Ruhr-Universität Bochum, Germany,
- Party P13.8: TU Delft, Delft University of Technology, The Netherlands,
- Party P13.9: UCL, Université Catholique de Louvain, Belgium,
- Party P13.10: ULG, University of Liège, Belgium,
- Party P13.11: UNED Madrid, Universidad Nacional de Educación a Distancia, Spain,
- Party P13.12: UPM, Universidad Politecnica De Madrid, Spain,
- Party P13.13: UPV, Universida Politècnica de Valencia - Instituto de Ingeniería Energética, Spain,
- Party P13.14: USDC, Universidade de Santiago de Compostela, Spain,
- Party P13.15: USE, Universidad de Sevilla, Spain,
- Party P13.16: UU, Uppsala University, Sweden,
- Party P13.17: ZSR, Zentrum für Strahlenschutz und Radioökologie, Universität Hannover, Germany.



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ENEN Advanced Courses Related Documents

NEPTUNO Web site

<http://www.sckcen.be/neptuno/deliverables>

- Overview of ENEN Advanced Courses and IP EUROTRANS courses (in preparation)
- Recommendations on Advanced Courses
- Recommendations on PhD level
- Recommendations on continued academic education

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FIVE ENEN COMMITTEES(3)

Training and Industrial Projects Committee

- Institut Jožef Stefan – Chair (SLO)
- Institute for Safety and Reliability (D)
- Institut national des Sciences et Techniques Nucléaires (F)
- Ústav Jaderného Výzkumu Řež (CZ)
- vacant

Objectives and Tasks: Dissemination and Use of Knowledge

- Identify industrial needs for continuous professional development
- Organize continuous training sessions and courses on different subjects of common interest for the affiliated associated members
- Maintain and disseminate a database on third cycle advanced courses and continued professional development sessions
- Facilitate and support professional training, mobility of professionals and access to large nuclear infrastructures
- Integrate European industrial and national projects

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ENEN International Seminar on the Nuclear Fuel Cycle 29/11-10/12, 2004




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**INTERNATIONAL SEMINAR
ON NUCLEAR FUEL CYCLE**



CEA, fuel assembly

FRANCE
NOVEMBER 29th
DECEMBER 10th, 2004



AFPA, IP3 reactor cell for the drawing
and drawing workshop (1st)

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OUTLINE PROGRAMME

Topics

- An overview of the nuclear fuel cycle
- Transport of nuclear fuel cycle materials
- Front end:
 - from mining to enrichment,
 - fuel: constraint, general design and thermal-mechanical design.
- Back end:
 - spent fuel management,
 - radwaste treatments,
 - storage of spent fuel and high level waste,
 - R&D in the field of the long-lived nuclear waste management.

Technical visits (indicative)

- FBFC fuel fabrication plant (FRAMATOME ANP)
- Uranium conversion plant (COMURHEX)
- Uranium enrichment plant (EURODIF)
- PWR NPP (EDF)
- Uranium recycling TU 5 workshop (COGEMA)
- Aube surface repository and Bure underground research laboratory (ANDRA)
- La Hague spent fuel reprocessing plant (COGEMA)

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ENEN Training Course on Nuclear Safety INSTN Saclay, April 4-22, 2005



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NEPTUNO Project

Within the 6th Euratom research and training programme on nuclear energy (2002-2006), the European Commission supports the project "Nuclear European Platform of Training and University Organisations": NEPTUNO.

NEPTUNO integrates European education and training in nuclear engineering, nuclear safety and other nuclear disciplines with the major objectives to secure qualified curricula in nuclear education at European universities according to the Bologna declaration and to harmonize professional training and accreditation schemes.

The NEPTUNO project builds on the achievements of the 5th European Framework Programme, which led to the establishment of the European Nuclear Education Network - the ENEN Association. The NEPTUNO project will enhance the harmonization of professional accreditation criteria and the associated training programmes across the European Union. The "International Seminar on the Nuclear Fuel Cycle" is a pilot training course planned for this purpose.

The expected result is:

- an operational network of institutions for academic education at the Master, doctoral and post-doctoral level,
- complemented with research organizations, regulatory bodies and industrial partners supporting research and development, bench-training and continual learning schemes.

The project is carried out under the coordination of the French National Institute for Nuclear Sciences and Technology (INSTN) by a consortium of 35 partners, including 23 universities and 10 research institutes or private companies from 19 countries. Twenty-six partners are also members of ENEN.

Websites / Contact Persons

➤ **NEPTUNO Project** <http://www.sckoen.be/neptunof/>
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**Training Course
on Nuclear Safety**



Saclay, France
April 4th - 22nd, 2005

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ENEN – EUR Training Course on Levelling the Playing ground for New Nuclear Power Plants in Europe, Helsinki June 6-10, 2005

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PRELIMINARY INFORMATION

Training course on nuclear design for post-graduate students and young professionals organized on June 6th-10th 2005 in Helsinki. The European background, the safety needs, the regulator position and the vendors' proposals for new nuclear plants in Europe.

EUROPEAN SAFETY REQUIREMENTS FOR NEW NUCLEAR POWER PLANTS

PRELIMINARY SCHEDULE

Monday, June 6

- 9.00 Registration & welcome address
- 9.30 2 Main drivers in design evolution and harmonization for new EUREX, EDF
- 10.00 Introduction to the EUR document and EUR main requirements for new plants (HIGHLIGHTS, VERTICAL)

Tuesday, June 7

- 8.30 EUR safety approach: safety targets, safety objectives in design, safety verification, assessment and severe accidents (to Long NOVOLL, SCOP, to Wabur LEWARD, TRACTEBEL ENGINEERING)
- 9.30 Regulatory background about safety (to Benoît DE BOECK, BFN)
- 10.00 EUR safety needs in safety harmonization (Sector to be specified later)

Wednesday, June 8

- 8.30 4 Projects being developed for Europe, various approaches (Sector to be specified later)
- 9.30 4 Vendor projects for Europe 1 (to François BOUVILLE, INDUSTRIAL AEP)
- 10.00 Vendor projects for Europe 2 (to Armin WÖRDLER, BUNDESANSTALT FÜR STRAHLENUNGSSCHUTZ)
- 11.00 Vendor projects for Europe 3 (to Bernd WÄLTER, ATOMENERGIEPROJEKT WÜRSCHAU)

Thursday, June 9

- 8.30 12 PV and identity analysis (standpoint) (to Paul WANDER, OPTIMA SA)
- 9.30 ICA ICAV and, respectively, grid manager standpoint (to Albert ALBERTI, FZKA)
- 10.00 10 Perspectives about risk informed approaches in operation and design (to Claude COSSAIE, EDF)
- 10.30 Conclusion and closure session (to Serge VAN GOETHER, EC; Luc VANROOYER, TRACTEBEL; Bernard ROUGE, EDF; Pierre BERRE, EDF)

Friday, June 10

- Technical visit at Lintula NPP

Course on Nuclear Safety of WWER Bratislava, May 2-6, 2005

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NEPTUNO Project

Within the 6th Euratom research and training programme on nuclear energy (2002-2006), the European Commission supports the project "Nuclear European Platform of Training and University Organisations", NEPTUNO.

NEPTUNO integrates European education and training in nuclear engineering, nuclear safety and other nuclear disciplines with the major objectives to secure qualified curricula in nuclear education at European universities according to the Bologna declaration and to harmonize professional training and accreditation schemes.

The NEPTUNO project builds on the achievements of the 5th European Framework Programme, which led to the establishment of the European Nuclear Education Network – the ENEN Association. The NEPTUNO project will enhance the harmonization of professional accreditation criteria and the associated training programmes across the European Union.

The expected result is an operational network of institutions for academic education at the Master, doctoral and post-doctoral level complemented with research organizations, regulatory bodies and industrial partners supporting research and development, bench-training and continual learning schemes.

The project is carried out under the coordination of the French National Institute for Nuclear Sciences and Technology (INES) by a consortium of 36 partners, including 25 universities and 10 research institutes or private companies from 19 countries. Twenty-six partners are also members of ENEN.

In Slovakia, SNEN (Slovak Nuclear Education Network) was created in 2003. It brings together 8 university faculties, 3 governmental organizations, 10 industrial partners, 1 international organization located in Slovakia and 1 professional organization.

Place: Bratislava, Slovakia
Duration: 1 week (May 2 – 6, 2005)
Registration deadline: March 21, 2005
Registration fee: 700€

Registration & Information

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Course on Nuclear Safety of WWER
Bratislava, Slovakia, May 2 – 6, 2005

Organised by the Slovak University of Technology and CENS (Center for Nuclear Safety) under the auspices of the ENEN Association





ENEN Training Course Results and Perspectives



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- Seminar on Nuclear Fuel Cycle (France)
 - Nov-Dec 2004 - 20 participants – 2 students
 - 2nd edition Nov 21-Dec 2, 2005 (France)
 - 15 participants – 2 students
 - 3rd edition planned 2006 (United Kingdom)
- Nuclear Safety Course held April 2005
 - 12 participants – 1 student
 - 2nd edition planned 2006 (Munich, Germany)
- Eugene Wigner course held in 2003, 2004, May 2005
 - 15 - 22 participants – majority of students
 - Annual edition planned (Austria, Hungary, Slovakia, Czech Republic)

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ENEN Training Course Results and Perspectives (continued)



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- Nuclear Safety for WWER Subcontractors
 - Bratislava May 2005
 - 10 participants
 - Recommendations formulated
- European Utility Requirements Course 2005
 - Helsinki 6-10 June, 2005
 - 35 participants registered – 5 students
 - Results being evaluated

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FIVE ENEN COMMITTEES(4)

Quality Assurance Committee

- Teknillinen Korkeakoulu Helsinki– Chair (SU)
- Université Catholique de Louvain (B)
- Institut national des Sciences et Techniques Nucléaires (F)
- Budapesti Műszaki és Gazdaságtudományi Egyetem (HU)
- Centrul de Inginerie Tehnologica Objective Nucleare (RO)

Objectives and Tasks

- Develop and implement QA processes to be applied in the design and delivery of education and training courses by the ENEN members
- Collect information and harmonise rules for selection, training and certification of teachers
- Evaluate and monitor the quality of current and newly proposed members of the ENEN Association
- Evaluate courses and award the International ENEN Course label, in collaboration with the ENEN Teaching and Academic Affairs Committee


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QA Committee Criteria for evaluating applications of ENEN Effective Members

Charact. #	Requirements	Judgment	Additional information needed
1	EU location	Satisfied or no	
2	High-level scientific education in the nuclear field	Specify the fields where high-level education is provided	
3a	Selective admission of students	Yes, No or NA	
3b	Full time teaching	Standard curriculum or not	
3c	Providing the bases for doctoral studies	Yes, No (what is lacking?)	
4	Internationally recognised research	Analysis per department	
5	Field(s) of research	List those you recognise as relevant	
6	Research carried out jointly	Number of staff, researchers, etc. significant or not	
7	Research in the same geographic location or joint venture	Optimal situation, or room for improvements	


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FIVE ENEN COMMITTEES (5)



Knowledge Management Committee

- Slovenská Technická Univerzita v Bratislave – Chair (SK)
- Atominstytut der Österreichischen Universitäten (A)
- Interfacultair Reactor Instituut – TU Delft (NL)
- Studiecentrum voor Kernenergie SCKCEN (B)
- Universität Stuttgart (D)

Objectives and Tasks: Dissemination and Use of Knowledge

- Identify and monitor deficiencies in scientific knowledge relevant to nuclear technology and safety
- Prepare, maintain and implement an action plan by academia in order to preserve valuable scientific knowledge
- Ensure efficient use of ICT for dissemination of knowledge, teaching and learning, databases and use of simulators
- Publish books, produce CDs and DVDs of interest to ENEN members
- Integrate and operate the ENEN web sites and communication systems

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NEPTUNO Communication System Status



- Is in full operation since August 2004
- Provides a platform for a common knowledge base for nuclear fission
- Merges classical database driven information systems with role-based research and education functionalities to a common knowledge system
- Needs content to become more useful
- <http://www.neptuno-cs.de/>

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NEPTUNO Communication System Main Features

- Based on a framework that uses a LEGO like approach to build web-based knowledge and communication systems for research and training using basic system components
- Basic system components customised to NEPTUNO needs
- Each component can be programmed to have access to other components (e.g. an on-line course supported by a simulation package)
- Provides basic support for communication in the nuclear community like addresses, data bases, technologies, E-learning platforms, etc.

Courses in Nuclear Disciplines

- Courses arranged in
 - 4 types
education, training, education and training, others
 - 14 categories covering different nuclear disciplines
- Total number of courses
737 collected from various sources and data sheets
- Approved courses confirmed and implemented by the
organising institution: 205 courses
- Not (yet) approved nor confirmed: 532 courses

Role-based access to a common knowledge base

- Different users have special role- dependent views on the common data base (e.g. teacher, student, scientist, etc.)
- Views on the database are optimised to respond to the needs of the role
- Knowledge can be easily managed
- Information is kept in one place with different access methods depending on the goal. Information is consistent, preserved and reused



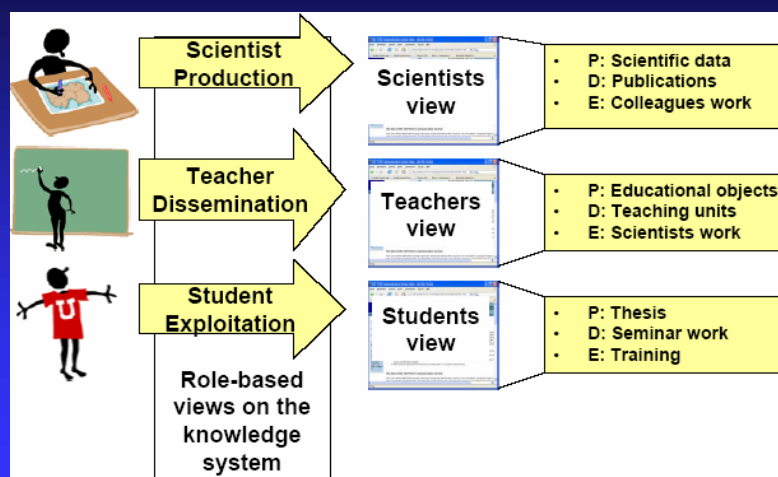
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Role-based access in research and training



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ENEN Perspectives

- Expand into nuclear disciplines outside nuclear engineering like radioprotection, radiochemistry, waste management
- Expand activities from the academic and research environment into the industrial and regulatory organisations and attract their membership
- Define, harmonise and promote international mutual recognition of professional training for key functions in nuclear industries, regulatory bodies and nuclear applications
- Participate to EC framework projects, in particular in the European Higher Education and European Research Areas
- Continue to support and strengthen cooperation with the World Nuclear University and the regional nuclear education networks in Asia, North America and elsewhere.

THANK YOU FOR YOUR ATTENTION

AND

WELCOME TO JOIN AND SUPPORT THE

**EUROPEAN NUCLEAR EDUCATION NETWORK
ASSOCIATION**

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