

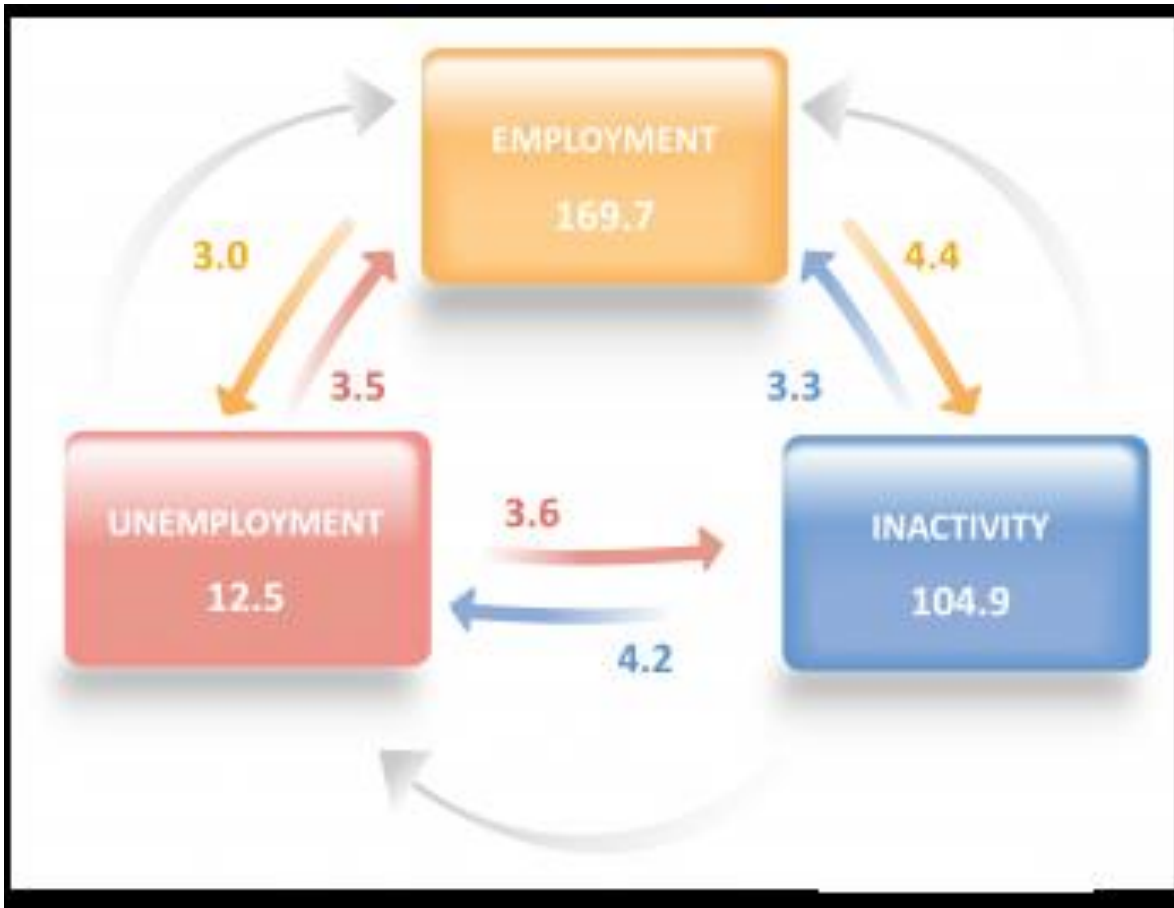
RICOMET 2016

*Risk perception, communication and ethics of exposures to ionizing radiations
Bucarest, Romania, June 1-3, 2016*

**An innovative vision on education and training programs
in radiological protection, nuclear and radiation safety**

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Schematic overview of labour market flows 2015Q3-Q4, EU-28 excluding Belgium and Germany (millions of persons) Source: Eurostat



Labour market flows show the movements of individuals between employment, unemployment and economic inactivity. They help to understand and interpret changes in the levels of labour market indicators based on the EU-Labour Force Survey (LFS). Eurostat publishes quarter-on-quarter flows for all Member States with the exception of Belgium and Germany. Quarterly data is available starting with the transition between the first and the third quarter of 2010

Can the future developments in nuclear (ex.: Decommissioning and/or new NPP's) and radiological sectors change the employment



PREPARE

Innovative integrated tools and platforms for radiological emergency preparedness and post-accident response in Europe

PREPARE main findings in E&T:

- ☐ General public is **quite sensitive** to the issues of radioactivity and radioactive contamination.
- ☐ **Credibility of the information** is a fundamental step to achieve public confidence in the skills and competences of the ones involved in decision making
- ☐ Public will more easily **trust** the communication established and the information received from technical/scientific experts than from politicians.
- ☐ **Education and training needs** related to emergency and post emergency situations were regarded as fundamental for technical, scientific, media and general public as well as for other stakeholders' awareness.
- ☐ What are the **role of the Universities, industry, WMO and EU institutions** in improving public's and stakeholder's **confidence** ?

Lately EU projects have been increasing the inclusion of:

- ☐ WP's on e education and training activities
- ☐ Tasks regarding dissemination of the information and communication with other stakeholders
- ☐ Only very recently, projects and WGs dedicated to E&T and communication have been funded

Examples:

PETRUS III –Ensure sustained training for geological disposal

CMET WG - Competence maintenance, education and training in radwaste

JOPRAD - Towards a Joint Programming on Radioactive Waste Disposal

OPERRA – Integrate, worldwide, radiation research activities with other scientific specific areas

EAGLE – Fostering institutions, media and general public Exchange of information about ionizing radiation and associated risks

PLATENSO – Socio-economic studies of interest to both the the academia and decision makers to improve public understanding of radiation and nuclear matters

CINCH-II – Strategic importance of specific training to foster lost skills with new tools

ENEN- European nuclear education network supporting various projects

ENETRAP III – European network for education and training in radiation protection

GENTLE – Creating a sustainable lifelong education and training programs in the field of nuclear fission technologies

EUTEMPE-RX- Training the next generation of medical physics experts in radiology

ANNETTE – Advanced networking for nuclear education, and transfer of expertise

NUSHARE – Sharing growing nuclear safety culture competence



Master in Radiological Protection and Safety - MPSR

Background:

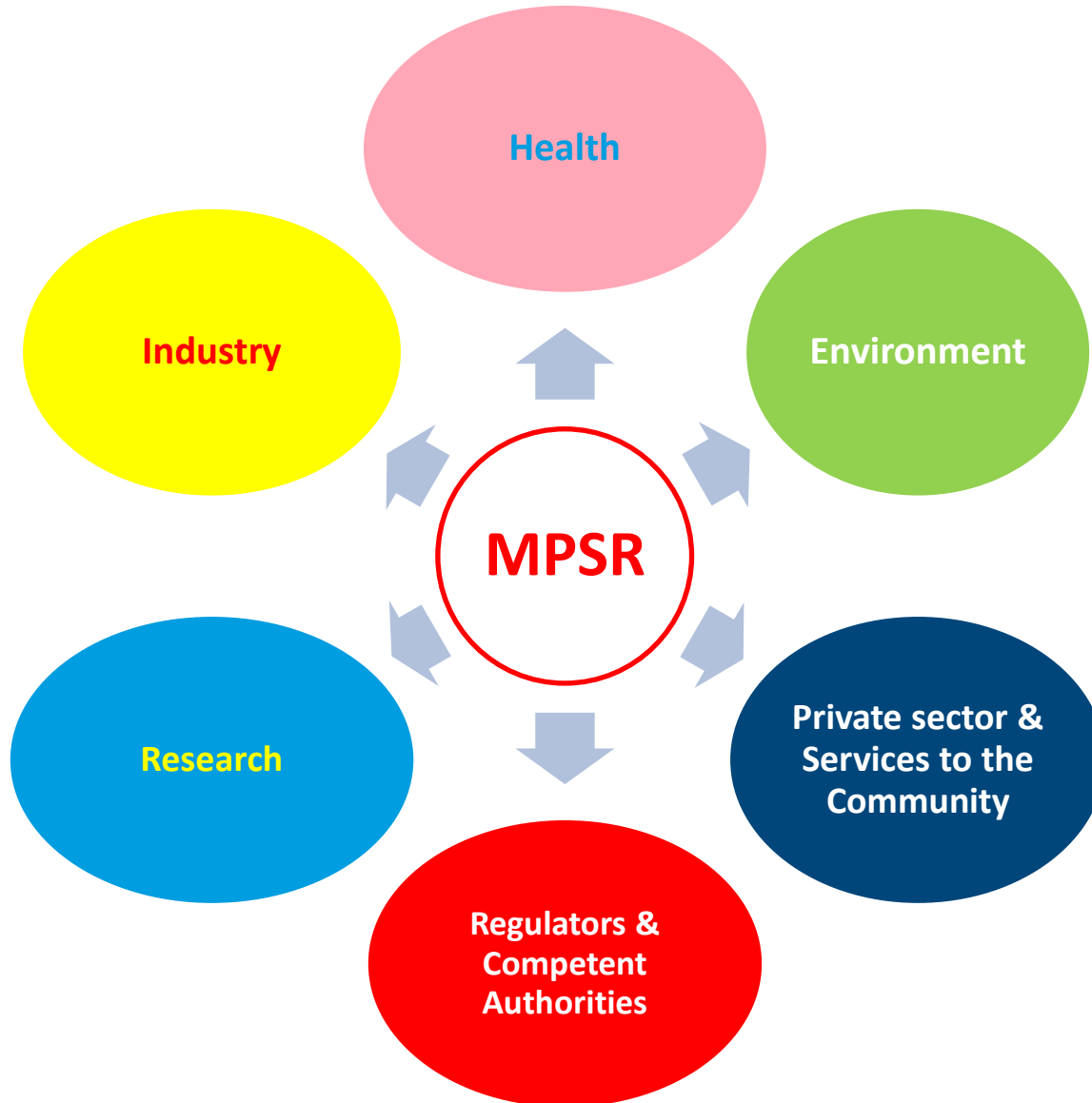
- Implementation of the "Waste" directive 2011/70/Euratom that requires that education and training programmes exist. Same requirement is included in the BSS (Directive 2013/59/Euratom) and in the directive for nuclear safety (2009/71/Euratom).
- Member States are assigned specific responsibilities in RPS, including the obligation of implementing education & training activities for existing professionals and future ones
- Definition of professional categories:
 - Expert in Radiation Protection
 - Responsible for Protection against Radiations
 - Expert in Medical Physics

2013/55/EU amendment (3) to the Directive 2005/36/EC on the recognition of professional qualifications.

- ☐ According to the changes planned for European level, implementation of professional qualifications and mutual recognition would be done via formal procedures according to European level directives.
- ☐ If the new European Professional Card is implemented and professionals take it, this could enhance lifelong learning and the individual's interest in taking responsibility of one's own learning, knowledge, skills and competence.
- ☐ As jobs and industries change on a continuous basis, this is a valid alternative for securing needed competencies in Europe.
- ☐ In addition to the new developments related to the recognition of the professional qualifications, the EC's role is to further bridge and integrate the developments in E&T across different DG's (DG RTD in Fission and Fusion and the DG EAC for learning from the current good European practices).
- ☐ ECVET is one example area to take advantage once one can ensure that the community's different stakeholders like universities, research institutes, WMOs and other industry organisations are aware of European level developments in alignment with the European objectives to avoid overlapping activities and maximise the existing opportunities.

MPSR

Interfaces com sectores de actividade



MPSR INFO

Semesters- 4

Total ECTS – 120

Mandatory ECTS – 102

Minimun Optional ECTS - 18

Successful Semester – 4 Mandatory + 1 Optional

Working Hours per Discipline – 168

Dissertation Working Hours – 840

Contact Hours – 40



MPSR

“Flow diagram”

1st Semester

- 30 ECTS

2nd Semester

- 30 ECTS
- Diploma in Radiological Protection and Safety

3rd Semester

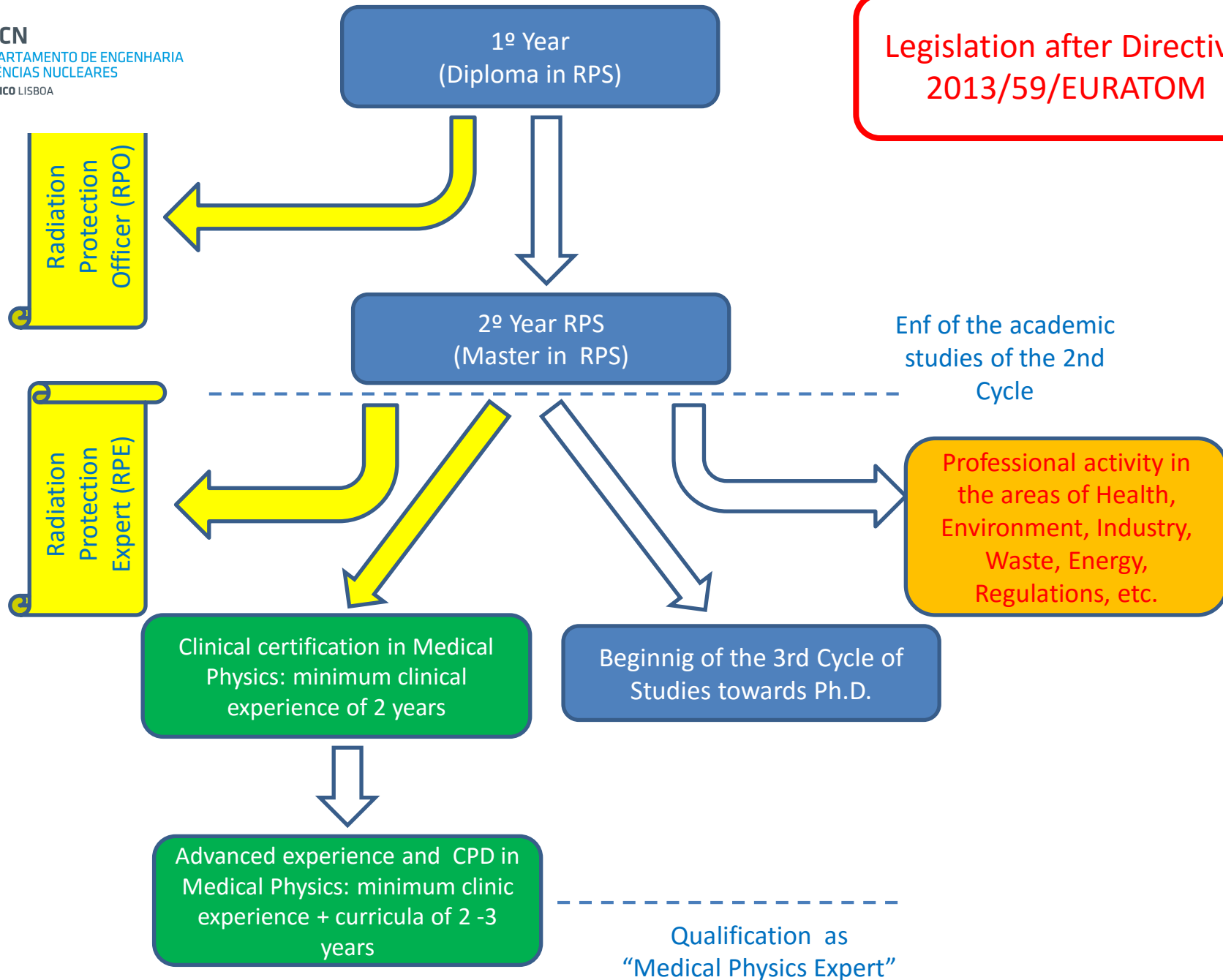
- 30 ECTS
- Dissertation choice of theme and beginning of the work

4rd Semester

- Master's dissertation ongoing work (30 ECTS)
- Master's Degree on Radiological Protection and Safety



Legislation after Directive
2013/59/EURATOM



1st YEAR				
1st Semester				
Discipline/ Main topic	Type/ ECTS	Discipline already at IST	New discipline at IST	Coordination & Comments
Fundamentals of Radiological protection and safety	Mandatory / 6	-	√	
Environmental Radioactivity	Mandatory / 6	-	√	
Radiation Dosimetry and Shielding	Mandatory/ 6	-	√	
Molecular Biotechnology	Mandatory / 6	√	-	
Radiation Physics	Optional / 6	√	-	
Functional and Comparative Genomics	Optional / 6	√	-	
Imaging	Optional / 6	√		
2nd Semester				
Radioactive Waste	Mandatory/ 6	-	√	NEW SUBJECTS
Radiological Protection and Dosimetry in Radiology and Nuclear Medicine	Mandatory/ 6	-	√	
Radiological Protection and Safety in Radiotherapy	Mandatory / 6	-	√	
Biological Effects of Radiation	Mandatory / 6	-	√	
Radiochemistry	Optional / 6	-	√	
Image Processing and Vision	Optional / 6	√	-	
Cells and Tissue Engineering	Optional / 6	√	-	
Nuclear Physics and Engineering	Optional / 6	√		



3 ^o Semestre				
Disciplina / Tópico Principal	Tipo de disciplina / ECTS	Disciplina já existente (Departamento do IST)	Disciplina nova (Departamento do IST)	Comentário
Health Systems Management: Concepts and Methods	Mandatory / 6	√	-	
Metrology of Ionizing Radiation in Health and Industry	Mandatory / 6	-	√	
Risk and Safety of the Ionizing Radiation Applications	Mandatory / 6	-	√	
Project in Radiological Protection	Mandatory / 6	-	√	With Seminars
Monte Carlo Simulation Methods	Optional/ 6	-	√	
Radiation Detection Systems and Techniques	Optional / 6	-	√	
Environmental Statistics	Optional / 6	√	-	

4 th Semester – Dissertation		
	ECTS	Comments
Dissertation Thesis	30	Obtention of Master Degree in Radiological Protection and Safety

New and old topic subjects on E&T in MPSR

- ❑ MPSR have in mind different target publics, therefore, the national language will be preferable. However, further studies into the topic either on university level or for professional users will benefit from international cross-fertilisation.
- ❑ MPSR will also be given in English if justified and that will be the case of radioactive waste (from non-nuclear and nuclear sectors) subjects.
- ❑ Radioactive waste chair will foster the strength of competence and skills acquisition crossing horizontal areas a knowledge even the so-called “areas of conflict”.
- ❑ This intends to providing a wider solid scientific and technical basis related to the topics taught that goes beyond the science and technology.
- ❑ Communication with the public, consistent dialogue with media, discussion of the ethics beyond the existing solutions for radwaste disposal, introduction to new tools (ex.: social media interactions in real time) and new common language concepts that intend to reduce the impact of “areas of conflict”, will be developed through international collaboration (invited seminars’ experts)
- ❑ Foster research oriented to solve society problems, renewal of lost jobs (skills and competences), new professional careers in nuclear and non-nuclear sectors. Links to other E&T programs going on are foreseen.

DESTINATÁRIOS

Licenciados em Física, Engenharia Física, Engenharia Física Tecnológica, Ciências Biológicas (Biologia, Bioquímica), Engenharia Biomédica, Engenharia Biológica, Biotecnologia, Química, Engenharia Química, Ciências do Ambiente, Engenharia do Ambiente, Radiologia, Medicina Nuclear ou Radioterapia (licenciaturas em Escolas Superiores de Tecnologias de Saúde), ou áreas científicas afins.

SAÍDAS PROFISSIONAIS

Os Mestres em PSR

Estarão habilitados para exercerem a sua actividade profissional nas áreas das aplicações das radiações ionizantes nos sectores da Saúde, Indústria, Ambiente, I&D, Serviços, Segurança, Energia e Regulação e Serão detentores das competências requeridas pela legislação para o desempenho de tarefas como "Especialista em Protecção Contra Radiações" e "Responsável pela Protecção Contra Radiações" de instalações radiológicas.

PROPINA

(em vigor no IST) **1068,47 €/ano**

design & layout A. N. Falcão



TÉCNICO
LISBOA

MESTRADO EM PROTECÇÃO E SEGURANÇA RADIOLÓGICA

Início
1º semestre
de 2016 - 2017

Responsável
Pedro Vaz



Contacto:
mestrado.psr@ctn.tecnico.ulisboa.pt

OBJECTIVOS

A Protecção e a Segurança Radiológica abordam um conjunto de tópicos multidisciplinares, de vanguarda do conhecimento e transversais a diversos domínios científicos e tecnológicos. As radiações ionizantes (RI) têm aplicações em diversos sectores tais como Saúde, Indústria, Ambiente, Investigação, Serviços, Segurança e Energia, nos quais os aspectos de Protecção Radiológica não podem ser descurados.

O Mestrado em Protecção e Segurança Radiológica (MPSR), mestrado único em Portugal, pretende responder às necessidades de Educação, Formação e Treino de profissionais envolvidos na utilização das RI, nos sectores anteriormente referidos. O MPSR oferece um vasto conjunto de disciplinas sobre resíduos radioactivos, radioactividade ambiente, metrologia, dosimetria, radiobiologia e efeitos biológicos das radiações, estudos e projectos de blindagem, risco e segurança radiológica e nuclear, acidentes e emergências radiológicas e nucleares.

O MPSR pretende dotar os futuros mestres de uma visão abrangente e integrada de diferentes tópicos científicos, tecnológicos, técnicos, socioeconómicos, éticos, legais, jurídicos, de regulação e legislação, em Protecção e Segurança Radiológica.

LOCAL

As aulas irão decorrer no Campus Tecnológico e Nuclear e no Campus da Alameda do IST.

PLANO DE ESTUDOS

O ciclo de estudos desenrolar-se-á durante **4 semestres**, com **120 ECTS**, conducente ao Grau de Mestre em Protecção e Segurança Radiológica. O plano de estudos completo envolve unidades curriculares obrigatórias, opcionais e um semestre de estágio e/ou elaboração do trabalho conducente à dissertação, a efectuar em instituição do meio hospitalar, industrial, empresarial ou de investigação.

Informação curricular detalhada em:
www.decn.tecnico.ulisboa.pt

CORPO DOCENTE

Professores, investigadores e especialistas, do IST (dos Departamentos de *Engenharia e Ciências Nucleares - DECN*, de *Bioengenharia - DBE*, de *Física - DF*, de *Engenharia e Gestão - DEG*, de *Engenharia Civil, Arquitectura e Georecursos - DECivil*), de instituições do meio hospitalar, industrial e empresarial, com ampla experiência de leccionação e vasto curriculum científico nos tópicos a leccionar.

CRITÉRIOS DE SELECÇÃO

Curriculum académico e científico, classificação da licenciatura, experiência profissional ou de investigação.

APOIOS

O Mestrado em Protecção e Segurança Radiológica tem o apoio das seguintes entidades e instituições:

Direcção Geral de Saúde, Agência Portuguesa do Ambiente, Instituições dos meios hospitalar, industrial e empresarial, nos sectores da:

Saúde
Indústria
Ambiente
Investigação
Serviços
Segurança
Energia

SAÚDE INDÚSTRIA AMBIENTE INVESTIGAÇÃO SERVIÇOS SEGURANÇA ENERGIA

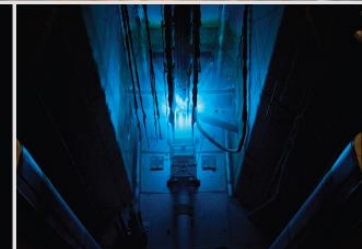
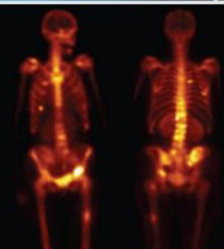


Mais informações

Núcleo de Pós-Graduação e Formação Contínua

Av. Rovisco Pais 1, 1049-001 Lisboa

Tel: 218419543 npfc@tecnico.ulisboa.pt



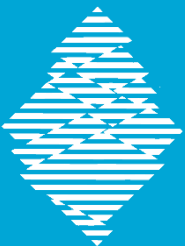
2nd PETRUS-OPERA and Early Stage Research Conference 2016

- At TU Delft, the Netherlands from 27th June to 1st July.

Radioactive Waste Management and Disposal

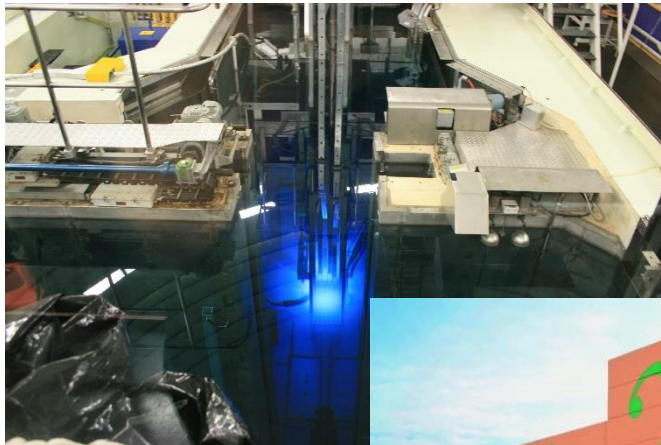
- Programme of expert lectures and participant presentations (see website for details)
- Field trips to:
 - Delft Research Reactor
 - COVRA storage facilities
 - The underground research laboratory HADES at SCK-CEN at Mol
- Arranged by the European PETRUS consortium and Dutch national OPERA project.

www.petrus-opera2016.eu



2nd PETRUS-OPERA and Early Stage Research Conference 2016

- Deadline to register 12th June.
- Deadline for abstract submission 31st May (please email asap if late)



www.petrus-opera2016.eu