

# 2019-2020

European Learning Initiatives  
for Nuclear Decommissioning  
and Environmental Remediation



## ELINDER

## CATALOGUE OF TRAINING COURSES

This document gives an overview of training courses on nuclear Decommissioning and Environmental remediation organized in the frame of the ELINDER project.





## European Learning Initiatives for Nuclear Decommissioning and Environmental Remediation

Nuclear decommissioning projects encompass all technical and management actions associated with ceasing operation of a nuclear installation and its subsequent dismantling to remove it from regulatory control, including the environmental remediation of the site. They are targeted at delivering an environmentally friendly end-product, in line with the 'circular economy', as promoted by EU and national policies.

Nuclear decommissioning is an industrial reality and significant growth is expected. In Europe, only few of the installations that were currently shut down have been fully decommissioned. Several other nuclear facilities will come to the end of their operation in the coming decade. The expectations of the market and the necessity to progress with decommissioning create the potential for new industrial activities. A clear global positioning of Europe will be an asset.



The availability of motivated, qualified and experienced personnel to support nuclear decommissioning is probably one of the most critical issues to address. For many years, the European nuclear sector is challenged by the increasing difficulty to recruit and maintain staff with the required expertise. But possibilities for careers in the field of nuclear decommissioning are even less considered, as the activity is not yet well known or not perceived as attractive.

Over the last years some learning initiatives were taken in European countries to improve of knowledge, skills and competences in nuclear decommissioning, going from short professional induction training programmes to academic graduate and postgraduate courses. ELINDER supports, coordinates, develops and promotes them in a joint project.

### **ELINDER**

The overall aim of the present ELINDER project is to raise the interest of students and professionals and to stimulate careers in this important and emerging field, by offering a set of attractive theoretical and practical learning opportunities.

In this sense ELINDER presents a *modular, coherent and commonly qualified training programme* in nuclear decommissioning.

The target groups for ELINDER are students at the end of their education cycle, young professionals at the start of their career and experienced professionals and managers who change their career orientation towards nuclear decommissioning.

## APPROACH

ELINDER is conceived as an integrated set of learning opportunities. The training programme consists of a series of modules, each of them including lectures, practical hands-on exercises and case studies at the premises of the organising partners and visits to relevant facilities.

- ✓ A one week '**generic training module**' serve as a general introduction and give a synopsis of the main decommissioning aspects. A selection can be made of one of the offered modules as described in this catalogues under G1 to G5.
- ✓ Additionally '**specific, topical training modules**' address more in depth a topics linked to decommissioning, topics which have been identified as pinch point areas, i.e. areas in which knowledge and skills need to be improved. Each module covers one specific topic, filed in this catalogue under S1 to S8.
- ✓ Complementary '**e-learning induction training modules**' are proposed to allow to better familiarize with the subject before participating to training in decommissioning.

## QUALIFICATION OF THE ELINDER COURSES

To ensure a coherent and harmonised approach, shared minimum quality criteria including learning outcomes will be defined for acceptance of the course modules within the ELINDER programme and receiving the "ELINDER stamp".

The following criteria need to be respected for Qualification of a course:

- i. The learning outcomes of the course are defined.
- ii. The prerequisites for the trainees are defined.
- iii. The training programme is coherent with the learning outcomes.
- iv. The training system is adapted to the learning outcomes.
- v. An assessment of the achievement of the learning outcomes is performed at the end of each course.
- vi. A satisfaction survey is organised at the end of the course.





Qualified courses are labelled with the "ELINDER stamp".

Periodic interaction through meetings, workshops and roundtables will allow a continuous aligning of the offered programme to the needs of the industry and other customers.

As a next, future step the programme should enable the certification of specific job profiles in nuclear decommissioning, following the ECVET credit system.

## COURSE LANGUAGES

The ELINDER courses are provided in the English language. 

Exceptions are the generic courses G3 and G4, respectively in the French and German language. 

## ELINDER PARTNERS AND INVOLVED ACTORS

ELINDER is coordinated by the European Commission Joint Research Centre in collaboration with several European universities and institutes. A Memorandum of Understanding was signed in 2016.

	Studiecentrum voor Kernenergie - Centre d'Etude de l'Energie Nucléaire	BE
	Karlsruher Institut für Technologie	DE
	Commissariat à l'énergie atomique et aux énergies alternatives	FR
UNIVERSITY OF BIRMINGHAM	University of Birmingham	UK
	Slovenská Technická Univerzita v Bratislave	SK
	University of Tartu	EE
	NUVIA	FR
	Società Gestione Impianti Nucleari	IT
	European Nuclear Education Network association	EU
	European Nuclear Safety Training & Tutoring Institute	EU
	European Nuclear Society	EU
	European Atomic Forum	EU
	European Commission Joint Research Centre	EU



The **IAEA** practically supports the ELINDER project through its expert networks, training tools and its technical cooperation programme. Practical Arrangements were signed in 2017.

The training courses are organised by the partners. The concept is fostered by industrial actors and organisations involved in nuclear decommissioning who are on a case to case basis invited for providing ad hoc lectures or practical exercises.





## AUDIENCE & PREREQUISITE EXPERIENCE FOR ATTENDING COURSES

To ensure the efficiency of the courses, the audience and prerequisite experience is defined for each course.

The minimum required education level is by default for all courses **EQF 6**, corresponding to a Bachelor Degree or equivalent<sup>1</sup>. For some courses a minimum education level **EQF 7** is required, corresponding to a Master Degree or equivalent.

For each course the prerequisite knowledge in nuclear technology is defined as such:

### PREREQUISITE KNOWLEDGE IN NUCLEAR TECHNOLOGY

	Limited knowledge about nuclear technologies, no real practical experience in the nuclear field
	General knowledge about nuclear technologies, at least one year of experience in the field, no experience in decommissioning
	Good knowledge about nuclear technologies, at least one year of experience in decommissioning activities
	Good knowledge about nuclear technologies, at least few years of experience in decommissioning activities

Obviously the 'generic training modules' (G1-G5) require less preliminary knowledge than the specific training modules (S1-S7).

In preparation of the courses, the knowledge in the field of nuclear technologies and decommissioning can be enhanced by the preliminary following of a series of e-learning courses. Pertinent e-learning induction training modules are presented in this catalogue.

## CONTACT

For overall information on the ELINDER preparation phase contact Pierre Kockerols or Daniela Santopolo, EC-JRC: [pierre.kockerols@ec.europa.eu](mailto:pierre.kockerols@ec.europa.eu) or [daniela.santopolo@ec.europa.eu](mailto:daniela.santopolo@ec.europa.eu)

<sup>1</sup> EQF or European Qualifications Framework

[https://ec.europa.eu/ploteus/search/site?f%5B0%5D=im\\_field\\_entity\\_type%3A97](https://ec.europa.eu/ploteus/search/site?f%5B0%5D=im_field_entity_type%3A97)

## ***e-LEARNING***

The ELINDER project intends to offer its applicants e-learning opportunities as preparation to its courses, providing a broad **introduction to nuclear decommissioning** and its main aspects. The IAEA practically supports the ELINDER project through access to its comprehensive e-learning package on nuclear decommissioning.



In order to access the IAEA Learning management System you will need to register and create a user-name and password on the [dedicated IAEA webpage](#) (the approach is well-explained on the website)

The e-learning offer linked to nuclear decommissioning is structured as follows:

1. **D&D 1: Strategy, Planning and Licensing**
  - D&D 1.1: Decommissioning Fundamentals**
  - D&D 1.2: Decommissioning Strategy**
  - D&D 1.3: Decommissioning Planning**
  - D&D 1.4: Licensing Process for Decommissioning**
2. D&D 2: Inventory
3. **D&D 3: Costing and Funding**
  - D&D 3.1: Decommissioning Costing**
  - D&D 3.2: Funding for Decommissioning**
4. D&D 4: Transition Period
5. D&D 5: Project Management and Organization and Detailed Planning
6. **D&D 6: Technical Aspect during Implementation**
  - D&D 6.1: Decontamination of Structures, Systems and Components (SSC)**
  - D&D 6.2: Dismantling and Demolition**
  - D&D 6.3: Decommissioning Material Management**
7. D&D 7: Site Redevelopment and Reuse
  - D&D 7.1: Technical and Regulatory Aspects
  - D&D 7.2: Social Aspects
8. D&D 8: Decommissioning Case Studies

For applicants to the ELINDER courses who are not familiar with nuclear decommissioning, it is advisable to take at least courses 1 (1.1-1.4), 3 (3.1-3.2) and 6 (6.1-6.3), **prior to the starting of their course.**





**ELINDER TRAINING COURSES****Generic training modules** as introduction to decommissioning

<b>General introduction to decommissioning</b>	G1	SCK•CEN (B)
relevant regulation and standards, status of the play, experience feedback, waste management approaches, technical and organisational topics, radiation safety issues, stakeholder involvement experiences	G2	STUBA (SK)
	G3	CEA (F)
	G4	KIT (D)
<i>(a modules G1 to G5 have basically the same learning outcomes)</i>	G5	JRC

**Specific, topical training modules** for a specialisation in decommissioning**Decommissioning planning and cost assessment**

regulatory framework, policies, decommissioning strategies and planning process, plant characterisation, decommissioning costing & funding, work preparation and management transition phase	S1	STUBA (SK)
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**Licensing and environmental impact assessment**

licensing, safety case, environmental impact assessment, global risk management, safety tools, safety operational experience feedback	S2	SCK•CEN (B)
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**Decommissioning safety**

safety assessment, risks identification, human factors, radiation protection, fire safety, risks linked to handling activities during decommissioning	S3	ENSTTI (F)
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**Programme and project management**

EU decommissioning market, program follow-up, project planning and project management, procurement and contracting, working with external companies, risk management	S4	NUVIA (F) and SOGIN (I)
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**Material and waste management in decommissioning**

waste and clearance regulation and international practices for waste management, waste categories, waste and material clearance, waste handling, packing and conditioning, waste accountancy	S5	CEA (F)
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**Decontamination and Dismantling techniques**

decommissioning strategies, decontamination techniques, dismantling and demolition techniques and machinery, new techniques in development, digitalisation and robots	S6	KIT (D)
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**Metrology for Waste Characterisation and Clearance**

waste and material characterisation methods, clearance approaches NDA and DA measurement techniques, measurement validation, metrology networks	S7	JRC (I)
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**Environmental remediation and site release**

regulatory framework, radiological characterisation of contaminated sites, remediation strategies, remediation technologies, final survey and monitoring, organisation, planning, resources and public communication	S8	UoB (UK)
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## Decommissioning of Nuclear Installations

G1

The main objective of this one-week training course is to acquaint participants with the basic requirements regarding the management of a decommissioning project. The course is provided by professionals from the Belgian nuclear research centre SCK•CEN, who share their experience from several past and ongoing decommissioning projects.

The course programme covers, over 5 days:

- ❖ The decommissioning legal and regulatory framework
- ❖ Strategies of decommissioning
- ❖ Project management of decommissioning
- ❖ Dismantling and decontamination operations
- ❖ Safety aspects and safety management of decommissioning
- ❖ Radiation dose monitoring: individual and workplace monitoring
- ❖ Inventory, facility and site characterisation
- ❖ Management and characterisation of material and waste
- ❖ Case studies (BR3 reactor, BN MOX fuel plant, Thetis reactor)

The course is concluded by a voluntary test for obtaining a course certificate.

### Expected audience for the course:

Engineers, technical and scientific staff from industrial companies, utilities, research centres, regulators, technical support organisations. Professionals and officials from public agencies and administration.

**Education level:** minimum EQF Level 6 required (Bachelor Degree)



### Mol, Belgium

Next course:

**3-7 December 2018**

Language: English

### Prerequisite knowledge in nuclear technology:



### Learning outcomes from the course:

- ✓ Comprehend the complex and multi-disciplinary decommissioning technologies and methods for characterisation, decontamination, dismantling and site release and waste management
- ✓ Comprehend the organisational challenges of decommissioning including strategies, planning and cost assessment, financial & human resources management and interaction with stakeholders
- ✓ Recognise and differentiate related international regulations and standards
- ✓ Grasp the difference between various types of decommissioning projects in the EU



### Price:

will be defined soon

### More info and registration:

[http://academy.sckcen.be/en/Customised\\_trainings/Calendar?tab=0](http://academy.sckcen.be/en/Customised_trainings/Calendar?tab=0)

course on Decommissioning 3-7.12.2018 will be published soon

## European Decommissioning Academy

G2

This two-weeks training course aims at acquainting the participants with the management of a decommissioning project. The course is provided by best professionals from the Slovak nuclear institutions (STUBA, JAVYS, DECOM,...) as well as from experts from IAEA and EC in form of lessons, practical exercises as well as on-site training at NPPs in decommissioning sites (V-1, A-1 in Jaslovské Bohunice).

The course programme covers, over 12 working days:

- ❖ The decommissioning legal and regulatory framework
- ❖ Strategies of decommissioning
- ❖ Project management of decommissioning
- ❖ Dismantling and decontamination operations
- ❖ Safety aspects and safety management of decommissioning
- ❖ Radiation dose monitoring: individual and workplace monitoring
- ❖ Inventory, facility and site characterisation
- ❖ Management and characterisation of material and waste
- ❖ Advanced procedures and technologies for decommissioning
- ❖ Storage and disposal facilities for radioactive waste
- ❖ Case studies (NPP A-1, NPP V-1 in Jaslovské Bohunice)

The course is concluded by a voluntary test for obtaining a course certificate.

### Expected audience for the course:

Engineers, technical and scientific staff from industrial companies, utilities, research centers, regulators, technical support organisations. Professionals and officials from public agencies and administration.

**Education level:** minimum EQF Level 6 required (Bachelor Degree)



**Bratislava, Slovakia**

**Next course:**

**3-15 June 2019**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the complex and multi-disciplinary decommissioning technologies and methods for characterisation, decontamination, dismantling and site release and waste management
- ✓ Comprehend the organisational challenges of decommissioning including strategies, planning and cost assessment, financial & human resources management and interaction with stakeholders
- ✓ Recognise and differentiate related international regulations and standards
- ✓ Grasp the difference between various types of decommissioning projects in the EU



### Price:

will be defined

**More info and registration:** <http://kome.snus.sk/inpe/eda/>

Registration info and programme course 3-15.6.2019 will be published in due time

## Initiation au Démantèlement des Installations nucléaires

G3

The course provided in French by the CEA INSTN ('Institut National des Sciences et Techniques Nucléaires') will familiarize the participants with the main issues for the decommissioning of nuclear installations.

The course programme covers, over 4 days:

- ❖ Decommissioning/dismantling: the regulatory framework
- ❖ The dismantling process
- ❖ Physical and radiological inventory
- ❖ Dismantling scenarios
- ❖ Cost assessment of dismantling projects
- ❖ Dismantling waste
- ❖ Decontamination
- ❖ Mechanical operations
- ❖ Demolishment of infrastructures
- ❖ Management of polluted soils
- ❖ Safety: risk assessment, safety documentation
- ❖ Environment: releases, impact assessments
- ❖ Radiation protection: risk assessments, ALARA approach
- ❖ Industrial safety: specific risks of dismantling

The course is concluded by a voluntary test for obtaining a course certificate.

### Expected audience for the course:

Engineers and technicians, newcomer in the field of decommissioning

**Education level:** minimum EQF Level 6 required (Bachelor Degree)

### Learning outcomes from the course:

- ✓ Comprehend the complex and multi-disciplinary decommissioning technologies and methods for characterisation, decontamination, dismantling and site release and waste management
- ✓ Comprehend the organisational challenges of decommissioning including strategies, planning and cost assessment, financial & human resources management and interaction with stakeholders
- ✓ Recognise and differentiate related international regulations and standards
- ✓ Grasp the difference between various types of decommissioning projects in the EU



**Marcoule, France**

**Next courses:**

**11-14 June 2019**

**19-22 November 2019**

**Language: French**

**Prerequisite knowledge  
in nuclear technology:**



**Price:**

will be defined soon

### More info and registration:

<http://www-instn.cea.fr/formations/formations-continues/liste-des-formations-courtes/initiation-au-demantement-des-installations-nucleaires,1916728.html>

## Verfahrenstechniken und Managementmethoden für den Rückbau kerntechnischer Anlagen

G4

The course in German is organised by the KIT ('Karlsruher Institut für Technologie') decommissioning group. Guest lecturers from the German industry are also invited to provide practical examples from own experience and industrial insights.

The course programme covers, over 4 days:

- ❖ Introduction to the KIT and Germany's status quo
- ❖ Boundary conditions for the decommissioning (legal framework, release criteria's, packaging, repository criteria's)
- ❖ Decommissioning strategies and project management
- ❖ Planning and Plant characterization
- ❖ Dismantling and handling techniques
- ❖ Remote controlled techniques for the decommissioning
- ❖ Decontamination and surface treatment techniques
- ❖ Demolition techniques
- ❖ Waste management and waste treatment
- ❖ Practical examples from own experience and industrial insights
- ❖ Current R&D in decommissioning

The course is terminated by accompanied site visits and concluded by a voluntary test for obtaining a course certificate.

### Expected audience for the course:

Engineers and technicians, newcomer in the field of decommissioning

**Education level:** minimum EQF Level 6 required (Bachelor Degree)



**Karlsruhe, Germany**

**Next course:**

**tbd**

**Language: German**

**Prerequisite knowledge in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the complex and multi-disciplinary decommissioning technologies and methods for characterisation, decontamination, dismantling and site release and waste management
- ✓ Comprehend the organisational challenges of decommissioning including strategies, planning and cost assessment, financial & human resources management and interaction with stakeholders
- ✓ Recognise and differentiate related international regulations and standards
- ✓ Grasp the difference between various types of decommissioning projects in the EU



**Price:**

will be defined soon

**More info and application:**

Will be published soon.

## Decommissioning Summer School

G5

The 'Decommissioning Summer School' is addressed to students in the area of engineering, science and technology, who want to profit from the holidays' time to enrich their curriculum in an area that offers new technological challenges: the dismantling of shutdown nuclear installations.

The course will give in 5 days an overview of the important issues related to nuclear decommissioning and waste management, combined with visits of the nuclear installations from JRC-Ispra and practical illustrative cases studies. The course programme will cover:

- ❖ International status of the play in nuclear decommissioning
- ❖ Radioactivity and radiation protection bases
- ❖ Planning of the decommissioning of a nuclear facility
- ❖ Technological aspects of characterisation, decontamination, dismantling and site release
- ❖ Management of the radioactive waste
- ❖ Societal aspects of decommissioning

The course is concluded by a voluntary test (for students who wish to obtain a course certificate) and terminated with a 'job fair' allowing students to meet representatives of industrial companies working in decommissioning.

### Expected audience for the course:

Master students (having an academic Bachelor degree in engineering, science or technology and studying for a Master degree)

### Learning outcomes from the course:

- ✓ Comprehend the complex and multi-disciplinary decommissioning technologies and methods for characterisation, decontamination, dismantling and site release and waste management
- ✓ Comprehend the organisational challenges of decommissioning including strategies, planning and cost assessment, financial & human resources management and interaction with stakeholders
- ✓ Recognise and differentiate related international regulations and standards
- ✓ Grasp the difference between various types of decommissioning projects in the EU



**Ispra, Italy**

**Next course:**

**8-12 July 2019**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**



**Price: the participation is free of charge**

*Interested students should complete the **application form** and will be selected on this basis (the course is not open to persons having a professional income).*



**More info and application:**

Will be published soon.



## Decommissioning Planning and Cost Assessment

S1

The specific course focusses on the know-how for *preparing* decommissioning activities: planning and cost assessment. The course will be supported with lectures from experienced Slovak companies as well as international organisations like the IAEA.

- ❖ regulatory framework of a decommissioning plan
- ❖ policies, decommissioning strategies
- ❖ planning process
- ❖ plant characterisation
- ❖ decommissioning costing & funding
- ❖ work preparation and management transition phase

A large attention is given to guided practical exercises, that will allow the students to develop their skills on the most relevant issues of the preparatory phase towards decommissioning

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:**

**Education level:** EQF Level 7 required (Master Degree)



**Bratislava, Slovakia**

**Next course:**

**planned for 2020**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the international policies, regulations and standards for elaborating a decommissioning plan and undertaking cost assessments
- ✓ Comprehend the essential responsibilities, the accountability and the role of management and professionals in decommissioning
- ✓ Recognize and differentiate the mechanisms of decommissioning funds
- ✓ Grasp the methods for plant characterisation and inventory management
- ✓ Grasp the approaches for waste and material management
- ✓ Able to initiate a decommissioning plan for a nuclear facility
- ✓ Able to outline the radiological characterisation plan of a nuclear facility
- ✓ Able to outline a waste management plan for a decommissioning project
- ✓ Able to undertake a cost assessment following the applicable standards



### Price:

€ 1750 (VAT incl.)

Deadline for registration: 1.9.2018

**More info and registration:** <http://kome.snus.sk/dpcam/>

## Decommissioning Licensing and Environmental Remediation

S2

The course gives an overview of the licensing issues and environmental aspect assessments that come into play when preparing and executing a nuclear decommissioning project:

- ❖ International standards and regulation
- ❖ Safety management issues
- ❖ Developing of a decommissioning safety case
- ❖ Environmental impact assessment
- ❖ Practical implementation and follow-up of safety aspects
- ❖ Risk identification and assessments
- ❖ Dose assessment and optimisation
- ❖ Stakeholder involvement

The course will include an ad hoc visit of a decommissioning project.

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** professionals involved in nuclear safety and environmental protection management

**Education level:** EQF Level 7 required (Master Degree)



**Mol, Belgium**

**Next course:**

**planned for 2019**

**Language: English**

**Prerequisite knowledge in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the safety (including industrial safety) risks and the environmental aspects related to the decommissioning of a nuclear installation
- ✓ Comprehend the regulatory framework for decommissioning and waste management
- ✓ Recognize and differentiate methods for risk assessments, safety and environmental monitoring
- ✓ Able to initiate a licensing file, including environmental impact assessment
- ✓ Able to perform risk assessments
- ✓ Able to develop safety procedures and deliver permits
- ✓ Able to apply a safety tool for dose assessments

**Price:**

will be defined in due time

**More info and registration:**

course will be advertised in due time



## Decommissioning Safety

S3

The training will start by the overview of decommissioning aspects and the presentation of ongoing decommissioning projects. The course will further present the methodologies for safety assessment and regulatory review of safety assessment implemented in France. This will be the starting point for lectures performed by specialists addressing the risks identification, human factors, radiation protection, fire safety, risks linked to handling activities during decommissioning and radiological characterisation vs waste management.

To illustrate how to deal with these issues, a test case in radiation protection during decommissioning will be proposed to the participants.

In addition, during this training, a specific session will be dedicated to innovative techniques for decommissioning related to 3D simulation and contaminated site characterization with geostatistics concepts.

**Expected audience for the course:** professionals mainly from Nuclear Regulatory Authorities and Technical Safety Organizations.

**Education level:** EQF Level 6 required (Bachelor Degree)

**Paris, France**

**Next course:**

**planned for 2019**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**



### Learning outcomes from the course:

- ✓ Introduce the fundamentals of decommissioning of nuclear facilities, including inter alia aspects of planning, conduct and termination of decommissioning,
- ✓ Enhance knowledge on the particularities of the decommissioning of different types of nuclear facilities and start points for decommissioning,
- ✓ Provide experience feedback on licensing and supervision during decommissioning,
- ✓ Introduce to the participants an internationally accepted methodology on the conduct of safety assessment for decommissioning,
- ✓ Introduce to the participants an internationally accepted methodology on the regulator review of the results of a safety assessment for decommissioning,
- ✓ Provide various national examples on safety assessment and related reviews,
- ✓ Explain the process of implementation of safety assessment results during conduct of decommissioning actions.

**Price:**

will be defined in due time

**More info and registration:**

course will be advertised in due time

## Decommissioning Programme and Project Management

S4

This course on 'decommissioning programme and project management' is organised by two industrial companies. Unique is that the course combines the views and experiences from two sides: the 'contracting authority' (SOGIN) and from 'contractor' (NUVIA).

The 1<sup>st</sup> week of the course is dedicated to lectures covering basically the full scope of decommissioning management:

- ❖ Management systems and strategies of D&WM
- ❖ Programme management (from contracting authority point of view)
- ❖ Project management (from contractor point of view)

A complementary 2<sup>nd</sup> week is organised on different nuclear sites where decommissioning projects are on-going in Italy (Caorso, Saluggia & Ispra). That week will focus on practical exercises and cases directly applicable to the visited installations. Real, experienced situations of programme and project management will be simulated and reviewed.

Each week is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** professionals involved in decommissioning management and related projects

**Education level:** minimum EQF Level 6 required (Bachelor Degree)



**Rome (1<sup>st</sup> week)**  
**+ sites of Caorso, Saluggia, Ispra (2<sup>nd</sup> week)**

**Next course:**  
**planned for 2019**

**Language: English**

**Prerequisite knowledge in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the possible decommissioning strategies with pro and cons
- ✓ Comprehend the possible ways of governance of a decommissioning programme, the organisation structures, management systems and the management of the human resources
- ✓ Understand the approaches for procurement and contract management
- ✓ Understand the methods for programme and project breakdown, scheduling and follow-up, including cost and risk control
- ✓ Seize the challenges of working with contractors or working for a contracting authority
- ✓ Seize the impact of the authorisation process in the execution of the decommissioning programme
- ✓ Able to elaborate and manage a plan for a decommissioning project including objectives, planning, resources, budget, cost and risk control mechanisms and reporting
- ✓ Able to prepare and implement a procurement plan



### Price:

€ 3450 (VAT incl.), transports between sites incl.

### More info and registration:

course will be advertised in due time

## Material and Waste Management in Decommissioning

S5

The proper management of waste arising on-site from decommissioning is an essential factor to the success of a programme. The course will clarify the international framework, the different management approaches and techniques to optimise the waste streams:

- ❖ International and national standards
- ❖ Waste categories and acceptance criteria
- ❖ Waste characterisation
- ❖ Waste and material clearance (approaches in EU countries)
- ❖ Industrial waste: regulation, sorting and recycling routes
- ❖ Waste treatment and conditioning techniques
- ❖ Waste transport and storage
- ❖ Technological aspects of characterisation, decontamination, dismantling and site release
- ❖ Waste management approaches and financing
- ❖ Elaboration of a waste management plan (case study)

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** professionals involved in decommissioning management, waste managers, project managers

**Education level:** Bachelor or Master Degree (EQF 6 or 7)



**Marcoule, France**

**Next course:**

**planned for 2019**

**Language: English**

**Prerequisite knowledge in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the international regulations and standards for the characterisation and management of waste and for the clearance/release of waste, materials and effluents
- ✓ Comprehend the practices for the waste and materials from decommissioning (sorting, packing, measurement, conditioning, transport, storage, ..) and the way of optimisation of their management
- ✓ Differentiate the different types of wastes as well as their evacuation routes
- ✓ Grasp the main practices for the final disposal of waste
- ✓ Grasp the main actors dealing with the management of waste and their respective responsibilities
- ✓ Able to elaborate a waste management plan for a decommissioning project
- ✓ Able to use waste accountancy tools



### Price:

will be defined in due time

### More info and registration:

course will be advertised in due time

## Decontamination and Dismantling Techniques

S6

The Institute for the technology and management of construction works is part of KIT and has acquired a large expertise in the dismantling of conventional and nuclear construction. The institute will share its expertise in a 5 days course covering:

- ❖ Dismantling work approaches in the conventional and nuclear field
- ❖ Decontamination techniques
- ❖ Dismantling and demolition techniques and machinery
- ❖ New techniques in development
- ❖ Digitalisation and robots

The course will include ad hoc visits to the related KIT laboratories as well as to nuclear dismantling activities on the Karlsruhe site.

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** professionals involved in decommissioning planning, decommissioning project managers

**Education level:** Bachelor or Master Degree (EQF 6 or 7)



**Karlsruhe, Germany**

**Next course:**

**planned for 2019**

**Language: English**

**Prerequisite knowledge in nuclear technology:**



### Learning outcomes from the course:

- ✓ Comprehend the different approaches for the decontamination and dismantling of components of an industrial installation
- ✓ Comprehend the decontamination techniques and their performances
- ✓ Comprehend the different types of dismantling machinery
- ✓ Comprehend the different types of remote control systems and robots and their performances
- ✓ Recognise the on-going technological developments in decontamination and dismantling
- ✓ Able to select the most appropriate decontamination and dismantling techniques for different types of nuclear installations
- ✓ Able to monitor the performances of a decontamination and dismantling project

### Price:

will be defined in due time

### More info and registration:

course will be advertised in due time

## Metrology for Decommissioning

S7



Decommissioning activities require expertise in various radiological measurement techniques: for the characterisation of the installations, for the characterisation of waste and for the clearance of materials and waste. Experts from the Joint Research Centre will explain the current practices and the developments in this field:

- ❖ Radiological measurement principles
- ❖ Destructive assessment techniques
- ❖ Non-destructive assessment techniques
- ❖ Measurement validation and statistics
- ❖ New developments in waste characterisation
- ❖ Waste and material clearance approaches
- ❖ Metrology networks

The course includes also hands-on exercises with the most common measurement devices and laboratory analysis techniques.

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** project managers, waste managers, radiation protection experts

**Education level:** Master Degree (EQF 7 or higher)

**Ispra, Italy**

**Next course:**

**planned for June 2019**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**



### Learning outcomes from the course:

- ✓ Understand the principles of the different radiation measurement systems
- ✓ Comprehend the site radiological characterisation procedures, methods and techniques
- ✓ Comprehend the different waste radiological measurement procedures, methods and techniques
- ✓ Comprehend the different waste and material clearance procedures, methods and techniques
- ✓ Recognise on-going technological developments in radiological characterisation methods and techniques
- ✓ Able to elaborate and monitor a characterisation plan in a nuclear installation
- ✓ Able to elaborate and monitor a clearance/release plan of a nuclear infrastructure



### Price:

will be defined in due time

## Environmental Remediation and Site Release

S8

A decommissioning is to release a site from regulatory control. This last step of any decommissioning programme may still give rise to an important activities, when environmental remediation is needed.

For this course organised by the University of Birmingham in collaboration with the IAEA various experts are invited to address the:

- ❖ regulatory framework for environmental remediation
- ❖ methods for radiological characterisation of sites
- ❖ different remediation strategies,
- ❖ existing remediation technologies,
- ❖ final survey and monitoring,
- ❖ organisation, planning, resources and public communications

A visit to the Sellafield site is planned to illustrate the implementation of environmental remediation activities on a decommissioning site.

The course is concluded by a voluntary test for obtaining a course certificate.

**Expected audience for the course:** professionals involved in decommissioning planning, decommissioning project managers

**Education level:** Bachelor or Master Degree (EQF 6 or 7)

### Learning outcomes from the course:

- ✓ Comprehend the international policies and regulations for site remediation and release
- ✓ Comprehend the environmental characterisation procedures and methods
- ✓ Comprehend the on-site and off-site remediation methods and techniques and their related performances
- ✓ Grasp the international experiences with environmental remediation
- ✓ Able to elaborate a site characterisation plan of a former nuclear facility
- ✓ Able to elaborate a site remediation and release plan

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### Price:

will be defined in due time

### More info and registration:

course will be advertised in due time



**Birmingham, UK**

**Next course:**

**planned for 2019**

**Language: English**

**Prerequisite knowledge  
in nuclear technology:**

