CONTINUING PROFESSIONAL TRAINING AT INSTM
a selection of our training and certification courses
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INSTN - OUR ADDED VALUE

Leading Higher Education institution using our unique expertise at the service of business

Comprehensive offer for developing competences in line with your projects

Excellent resources and methods

+ Partnership approach in line with operational requirements

+ Comprehensive offer for developing competences in line with your projects

+ Excellent resources and methods

Our French and International certifications and accreditations:

INSTN, THE FRENCH EDUCATION AND TRAINING INSTITUTE FOR NUCLEAR APPLICATIONS

For over 60 years, INSTN has been supporting nuclear sector development with academic and professional training programmes in the field of nuclear technologies, and their industrial and radiopharmaceutical applications. Through our expertise, we continue to demonstrate INSTN’s role as the French Education and Training Institute for Nuclear Applications.

INSTN, an institute administered by the CEA, supports the scientific and industrial development of the French nuclear sector by transferring knowledge and competences. At INSTN, we provide highly specialised education and training courses in nuclear science and technology applied to the energy and health sectors, at all levels of qualification - from operator, to engineer or researcher.
Built on many years of experience, as well as our close links with CEA laboratories and high-level partners, INSTN’s expertise covers a wide range of fields of competence and specialisation required by nuclear sector professionals:

- Nuclear Energy
- Ionising Radiation
- Nuclear Applications in Human Health
- New Technologies and Alternative Energies

INSTN is strongly committed to supporting companies who are looking to recruit, and develop the competences of their personnel, according to their operational objectives. In 2016 and 2017, our Institute’s partnership approach led to the development of numerous strategic partnerships with key players in industry, education and research, in the Nuclear Power and Nuclear for Health sectors. Establishing such close links with our partners is essential in order to meet the challenges of developing competences, performance and competitiveness of the sector.

With a key role, both nationally and internationally, we also invest in INSTN’s local strategy through our regional Training Centres, which are closely involved in their academic and industrial communities. INSTN is located across five sites in France.

INSTN AND OUR INTERNATIONAL NETWORK

For several years now, we have been further developing INSTN’s international programme. In 2016, INSTN was designated as an IAEA ‘Collaborating Centre’, the first in Europe. This accreditation has further strengthened our international development in 2016 and 2017, with agreements signed with European, African and Middle Eastern partners. In support of the CEA’s International Relations Division and key players of the French Nuclear Industry, INSTN develops tailor-made solutions which meet the challenges of developing competences for the Nuclear Energy and Nuclear Applications in Human Health sectors.
INSTN FOUNDATION

At the end of 2016, we provided the impetus for the creation of the INSTN Foundation supported by Fondation de France. Its three founding members, Apave, Assystem and Nuvia, industrial partners of INSTN, are likewise committed to sharing scientific knowledge and increasing public awareness of science. The main objectives of the Foundation are:
• creating teaching funds
• improving student life conditions
• designing innovative educational tools and facilities
• transferring knowledge.

TOWARDS A DIGITAL TRANSFORMATION OF OUR TOOLS FOR EDUCATION AND TRAINING

In the current context of digitalisation of the nuclear sector, and in line with INSTN’s missions, digital transformation has become a priority for our Institute, in order to adapt to a changing professional environment and expand our training offer ensuring that we have a competitive edge. By using digital technologies we ensure that our education and training programmes are adapted to the industries of the future. As such, INSTN makes effective use of digital tools and solutions adapted to our fields of expertise: certification and degree courses, continuing professional training courses, and advice and expertise services.

FROM LABORATORIES FOR PRACTICAL WORK TO DIGITAL FACILITIES

/ Site Training Schools and Laboratories
In addition to the CEA's research laboratories, trainees have the opportunity to carry out practical work and case studies in INSTN laboratories during training courses in our areas of expertise:
• Metrology Laboratory, Cadarache: laboratory for developing understanding of ionising radiation-materials interaction.
• Molecular Biology and Biochemistry Laboratory, Saclay: agitators, incubators, centrifuge, Polymerase Chain Reaction (PCR) machine, UV transilluminator, equipment for electrophoresis, high-performance liquid chromatography (HPLC), etc.
• Cellular Biology Laboratory, Saclay: equipped with two Laminar Flow Cabinets, a Leica DM IRB (fluorescence) microscope, two optical microscopes and a CO2 incubator.
• Teaching Laboratory for Detection of Ionising Radiation: equipped with 3 teaching rooms which can hold up to 12 identical measurement workstations for radiation detection practical work and experiments, in particular for metrology of radioactive substances.
• Metallurgy Laboratory, Saclay: X-ray powder diffractometer (D5000) for analysing and identifying crystal structures, measurement of crystallite size, phase quantification, etc., associated software: DIFFRACplus measurement (XRD Commander), DIFFRACplus Evaluation (EVA, pdf-2).
• Materials and Metallurgy Laboratory, Saclay: equipped with scanning electron microscope (SEM), X-ray microanalysis system (EDS) and a tensile testing bench for characterising mechanical properties of materials.
• Laboratory for Metrology of $\beta$ emitters and total $\alpha\beta$: equipped with a liquid scintillation system and proportional counters.
• Radiation Protection Laboratory, Saclay: for practical work and near real-life practice scenarios focused on applying radiation protection rules in industrial and research laboratories.

INSTN has Site Training Schools (chantiers-écoles) at four of our Training Centres:
• Cadarache: Site Training School with inactive glovebox
• Cherbourg-Octeville: Site Training School certified CEFRI-F for the following streams:
  - ‘Nuclear Reactor’ ($RN$), accredited by EDF: training in the field of maintenance ‘Common Knowledge of Nuclear’ (SCN) and ‘Safety-Quality Option’ (CSQ), as well as training in the field of ‘Radiation Protection’ (RP)
  - ‘Fuel Cycle’ (CC) and ‘Naval Nuclear Propulsion’ (RNE): Risk Prevention (PR) training
• Marcoule: Site Training School certified CEFRI-F for the ‘Research Centre’ (CR) and ‘Fuel Cycle’ (CC) streams: ‘Risk Prevention’ (PR) training
• Saclay: Site Training School certified CEFRI-F for the ‘Research Centre’ (CR) stream: ‘Risk Prevention’ (PR) training.

/ Communication Systems and Digital Equipment
INSTN Training Centres have specialised innovative communication systems and digital equipment for distance learning and evaluation.

INSTN is equipped with telepresence, a high-end video conferencing system, installed in-class for distance learning, allowing trainees at another site to follow a training course remotely.

Our Institute has invested in innovative and interactive video projectors with integrated Interactive Whiteboards (IWB), using touchscreen stylus pens for updating a PowerPoint presentation live, during a training session. We have also installed a highly reliable Institute-wide wifi network for use by everyone associated with a research or education and training facility, requiring internet access during their training year at INSTN.
HIGHLY SPECIALISED REACTOR OPERATING SIMULATORS AND COMPUTING SOFTWARE

/ Computing Software
INSTN provides trainees following specific training programmes with access to computing software and codes for studying overall reactor operation, from core to circuits. These advanced systems are, in large part, the result of CEA research and expertise: Cathare, Apollo, Tripoli and Flica; as well as those specifically adapted for training purposes: Thermoptim, MicroShield, Dosimex, etc.

/ Nuclear Reactor Operating Simulators

• **C-PWR Simulator**
One of three simulation tools in the PWR Training Tools suite developed by CORYS. This simulator is designed for training in the basic principles of normal operation of a PWR unit. The C-PWR simulator covers reactor startup from normal shutdown, with residual heat removal system (RRA - refroidissement du réacteur à l’arrêt), up to connection to the grid, load-following mode, and disconnection from the grid.

• **SOFIA Simulator**
SOFIA, ‘Simulator for Observing Operation during Incident and Accident’, is used for safety studies (engineering) and training, and was developed for IRSN and AREVA. This simulator models the primary and secondary circuits, up to the turbine and the residual heat removal system (RRA), using the CATHARE (V2.5-1) code developed by the CEA.

• **SIRENa Simulator**
SIRENa is a simulator designed for studying Fast Neutron Reactors. It is used for tutorials and simulating normal or incident operation of Sodium-Cooled Fast Reactors (SFR). It can be used for working on near real-life scenarios, giving each trainee a different role, for applying operating instructions in a nuclear power plant facility.

IMMERSIVE AND INNOVATIVE DIGITAL LEARNING TOOLS
The digital transformation underway within the nuclear sector makes it possible to overcome specific geographical and material constraints, for example, through organisation of practical sessions on training reactors via the Internet, for foreign countries, a system in place at INSTN since 2016, with IAEA support.

/ ISIS Training Reactor and 3D Simulator
Located at the CEA’s Paris-Saclay Centre, the ISIS research reactor is operated by the CEA’s Nuclear Energy Division (DEN - Direction de l’énergie nucléaire).

The ISIS training reactor is an essential tool for INSTN’s education and training programmes, which makes it possible to control the nuclear reactor neutron flow and understand the operating principles of neutron detectors and measurement systems used in different operating modes at different power levels. In addition to on-site sessions, the ISIS reactor is equipped with a video conferencing system, which allows interactive sessions to be broadcast via the Internet to trainees abroad.
The system was set up as part of the international Internet Reactor Laboratory (IRL) programme of the International Atomic Energy Agency (IAEA).

Today, as development and use of 3D virtual reality and simulation technologies by many communities and countries accelerates, augmented reality (AR) is coming to INSTN with our ambitious 4D Virtual Training Reactor project, currently under development.

/Digital Education Resources and E-learning

• Online Training Courses
INSTN has designed several MOOCs and SPOCs. Following on from several projects with partner schools and universities, we have successfully set up INSTN’s first SPOC called ‘Recycling Chemistry’. Two MOOCs are currently in development, one of which in collaboration with the SFEN, with the input of our Institute’s and the CEA’s expertise in educational methods, as well as resources, using our video recording studio at our Saclay Centre.

• The Serious Game O.S.I.R.I.S (Tool for Simulation and Operation in Ionising Radiation - Outil de Simulation et d’Intervention sous Rayonnements Ionisants).
A ‘Serious Game’, comprises a computer programme which combines a ‘serious’ purpose - educational, informative, communicative, marketing, ideological or training - with entertaining resources. INSTN recently invested in the Serious Game, OSIRIS. Users of this tool, Competent Persons in Radiation Protection (PCR - Personnes Compétentes en Radioprotection) or Radiation Protectionists, are completely free to develop their competences by carrying out measurements, using specialised radiation protection instruments in different scenarios, in real-time with a 3D first-person perspective.

A MOOC ON THE KEY CHALLENGES FACING NUCLEAR ENERGY
INSTN is committed to the digital transformation of education and training. Education and training methods and tools are continually being developed in order to effectively meet the needs of the industry and those of our trainees. In line with our mission of transferring knowledge and developing competences in nuclear, INSTN, in collaboration with the SFEN, offers a MOOC which provides a wide audience with an opportunity to familiarise themselves with Nuclear Energy issues and learn more about the key questions surrounding its role in the energy transition. The original style of this MOOC allows each participant to select the level and how much time they wish to commit according to their objectives.

• Radiation Protection Basics
This online course, developed in partnership with Kapitude, consists of a set of e-learning training modules for acquiring knowledge of radiation protection using an entertaining approach with personalised graphics (cartoons, videos, etc.), numerous quizzes and exercises, as well as on-demand educational and technical support from a training supervisor. The course can be taken to prepare for regulatory training courses, such as ‘Competent Person in Radiation Protection’ (Personne compétente en radioprotection).
• Immersive 3D Studio for Radiotherapy
Since 2014, INSTN has provided a multi-environment immersive studio for use by trainers and learners. This new facility houses a wall screen for 3D stereoscopic projection of images for a user wearing active 3D glasses. First of its kind in France, the VERT® (Virtual Environment Radiotherapy Training) system, developed by the British company, VERTUAL® is designed for education and training in radiotherapy. By simulating a treatment room, VERT® allows users to handle, virtually, all of the features of a radiotherapy treatment machine. The system also enables trainees to visualise complex treatments, as well as the set of training modules on the physical properties, principles and control procedures of the equipment. Comprising a set of training modules for multiple purposes, VERT® is a versatile educational tool used to support learning.
Website: http://www.vertual.eu/home/

A TEAM OF EXPERTS IN EDUCATION & TRAINING SYSTEMS AND CERTIFICATION READY TO HELP

Following an approach inspired by the SAT (Systematic Approach to Training) methodology, INSTN supports you by:

Analyzing your operational needs
Offering multi-modal training systems which meet your needs
Design and delivery of tailor-made professional training courses in French or English
Evaluation of learning and acquired competences, and certification

AN EDUCATIONAL APPROACH FOCUSED ON PROFESSIONALISATION

INSTN’s teaching staff regularly consult with nuclear sector professionals and those from health institutions, in order to adapt our offer according to changes in job requirements and needs for specific competences. Our team works with companies to develop training systems for professional qualifications or certifications, following a ‘competences and professionalisation’ approach:

• Analysis of professional activities and workplace situations
• Identification of learners and their competence needs throughout their career (starting a job, adapting to their role, developing expertise, professional development or retraining, etc.)
• Development of standards (competences, certification) and/or specifications
• Design and delivery of active Education and Training methods based on learning outcomes
• Supporting trainees in addition to their training course material by providing advice by telephone or in tutorials
• Evaluation and certification of learning and acquired competences
OUR OFFER

Following on from our Initial Education offer, INSTN offers a wide range of training programmes designed to develop the competences of professionals, employees or freelancers from both the public and private sectors, as well as job seekers. This offer is continually updated and improved in line with developments in professional knowledge, methods and techniques, as well as regulations and market needs. We evaluate competences on completion of the training courses, in order to award recognised individual professional certifications, which demonstrate that staff are qualified for their job. We also apply our expertise in the design and/or delivery of tailor-made training programmes for individual companies. These are designed following a coherent approach based on the SAT (Systematic Approach to Training) methodology recommended by the IAEA.

MANAGEMENT OF COMPLEX PROJECTS

The energy sector is undergoing a rapid transformation resulting in increasingly complex supply chains and distribution networks. Numerous projects are underway, within a changing economic, political, relational and sociological context, impacting stakeholders and requiring the use of new technologies.

In light of these challenges, and in line with key client expectations, we have strengthened and developed INSTN’s offer by providing a comprehensive programme for a Diploma or Continuing Professional Training Certification in ‘Management of Complex Projects’. This programme covers two fields: Nuclear Energy (R&D, cleanup/decommissioning, etc.) and Alternative Energies.

OVERVIEW OF OUR OFFER

1. Pressurised Water Reactors and Fuel Cycle
2. Research Reactors and Fast Neutron Reactors
3. Materials and Characterisation
4. Operation and Maintenance of Nuclear Facilities
5. Cleanup, Decommissioning and Waste Management
6. Nuclear Safety and Security
7. Alternative Energies
8. Radiation Protection of Personnel
9. Radiation Protection Professionals
10. Nuclear Applications in Human Health
11. Micro and Nanotechnologies
12. Radioactivity and the Environment
13. Professional Development for Careers in Science
Pressurised Water Reactors make up 60% of the global nuclear fleet, the vast majority of reactors under construction and the entire French fleet. INSTN offers a set of training courses for trainees to learn about how these reactors work and understand the underlying physics principles in the reactor core and main circuits.

Uranium fuel is a highly technical product whose fabrication, from mine to reactor, and reprocessing after use, involves a series of technological processes. INSTN offers a comprehensive programme, covering all the stages of the nuclear fuel cycle and the life cycle of a nuclear reactor, with a focus on Pressurised Water Reactors. The courses develop knowledge and know-how, from basics to expertise.
1. Pressurised Water Reactors and Fuel Cycle

### BASICS OF NUCLEAR REACTOR OPERATION

/ Code reference: 184

/Public
This course is for you if: you are a Nuclear Technician or Engineer; you have a technical and/or scientific background in the nuclear field.

/Objective
This course gives you a broad and comprehensive overview of the principles of operating nuclear reactors, their systems and main components, with particular focus on nuclear safety principles and practices. The course covers the different types of reactors and their development through time. This course leads on to the more specialised ‘Features of Research Reactors’ course.

/ Maximum number of trainees: 24

### OVERVIEW OF THE NUCLEAR FUEL CYCLE

/ Code reference: 016

/Public
This course is for you if: you are an Engineer, Researcher or Technician with a degree in science or the nuclear field.

/Objective
This course covers the different stages of the nuclear fuel cycle, including details of processes used, interactions and connections between stages. You will learn about the fuel cycle in its broader context, covering safety, technology, economics and commercial aspects, looking at the integration of industrial policy, and taking nuclear into account in the opening of electricity markets.

/ Maximum number of trainees: 12
1. Pressurised Water Reactors and Fuel Cycle

/// SPOC IN RECYCLING CHEMISTRY ///

/ Code reference: 36B

/ Public
You are a researcher or a PhD student or a postdoctoral researcher.

/ Objective
The course provides you with a solid foundation in separation chemistry and develops your understanding of its applications, including recycling. These are illustrated by case studies of the optimised technology used for effective separation of species between phases.

/ Individual training:

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2. PRESSURISED WATER REACTORS OPERATION

/ Code reference: 007

/ Public
This course is for you if: you are an Engineer, Researcher or Technician in the nuclear field.

/ Objective
After reviewing operating principles, the main circuits and components, you will look at the different operating modes and associated controls. You will learn about the main transient conditions in normal, incident and accident modes, as well as the more advanced aspects of operating control systems for ensuring safety. The course also covers post nuclear accident situations, for which you will select and assess applicable rules, procedures and behaviours.

/ Maximum number of trainees: 20

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2. RESEARCH REACTORS AND FAST NEUTRON REACTORS

Whilst the underlying physics of research reactors is identical to those of power reactors, their design and the technologies used are specifically adapted for research: ease of conducting experiments, irradiation level and quality of measurements. The training programmes offered highlight these features thanks to input from experts in the design and operation of CEA reactors (Eole, Masurca, Minerve, Osiris, Orphée, JHR (RJH)) and the researchers conducting the experiments.

In addition, the six reactor technologies selected by the Generation IV International Forum (GIF) are presented in detail in an INSTN training course endorsed by GIF and the OECD’s Nuclear Energy Agency. French-speaking trainees looking to improve their understanding of Sodium-Cooled Fast Reactors (SFRs) can follow five courses focused on the technology, where trainers, experts from the CEA, EDF and Areva, share their lessons learned on the French SFRs: Rapsodie, Phénix and Superphénix. Technical visits to facilities (Phénix, Masurca, the Rapsodie Control Room, test loops) help to put the material covered in seminars in perspective. Additionally, training offered by the Sodium and Liquid Metals School (École du sodium et des métaux liquides) covers operation, cleanup and decommissioning of sodium from nuclear facilities.
2. Research Reactors and Fast Neutron Reactors

INTRODUCTION TO RESEARCH REACTORS - JHR

/ Code reference: 924

/ Public
This course is for you if: you are a nuclear industry professional; you already have a solid background in nuclear reactor operation.

/ Objective
The course provides you with an overview of the different current and future research reactors. There is particular focus on the Jules Horowitz Reactor (JHR - RJP), as a reference throughout the course, when looking at the neutronics and thermohydraulics of the reactor, the fuel, the reactor core, instrumentation and research systems.

/ Maximum number of trainees: 20

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NUCLEAR REACTOR CONTROL ROOM

/ Code reference: TCC

/ Public
This course is for you if: you are a nuclear reactor Operating Technician; you have a solid background in nuclear reactors.

/ Objective
You will learn about and develop the operational competences required for operating a research reactor, with a particular focus on operational safety.

/ Maximum number of trainees: 16

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In partnership with CEA and Areva

Certificate after evaluation. In partnership with CEA and Areva
2. Research Reactors and Fast Neutron Reactors

/ GENERATION IV: NUCLEAR REACTOR SYSTEMS FOR THE FUTURE

/ Code reference: 558

/ Public
You are professional, researches and student with an interest in a global view of on the 4th generation of nuclear reactors.

/ Objective
The main aim of the course is to provide you with an up-to-date overview of the six reactor technologies, selected by the Generation IV International Forum (GIF), for further research and development of the 4th generation of nuclear systems. You will look at the main characteristics, advantages and challenges of each type, in terms of performance, safety, and role in future power mixes.

/ Maximum number of trainees: 20

/ SODIUM TECHNOLOGY AND SODIUM LOOP OPERATION – PRACTICAL TECHNIQUES

/ Code reference: 35B

/ Public
You are young engineer who intend to work on the operation of sodium loops or installations and you want to get a detailed understanding of their specificities.

/ Objective
You will cover the characteristics of sodium and sodium facilities, looking at the design and commissioning of sodium loops, followed by operating activities, with a focus on sodium instrumentation. A significant part of the course deals with safety at sodium facilities, covering the main operating incidents, their consequences and associated detection and protection systems. You will also look at operating procedures for sodium loops.

/ Maximum number of trainees: 12
Materials for energy is of key importance in two main areas of industrial development: nuclear energy (fission and fusion), and alternative energies (solar power, energy storage, hydrogen storage, etc.). The topic covers material design, characterisation and analysing behaviours under operating conditions, which can be extreme, such as those in a nuclear environment (irradiation, high temperature, oxidising atmosphere).

At INSTN, we strive to share our expertise in the field of materials, for nuclear applications in particular, in collaboration with CEA research divisions and Plateau de Saclay research institutions, such as Synchrotron SOLEIL, the French synchrotron facility and research laboratory, by offering specialised training programmes in the field.

This field of study is of key importance to all those involved in sectors reliant on materials, from research to expertise, up to production.
3. Materials and Characterisation

**CORROSION IN PRESSURISED WATER REACTOR NUCLEAR POWER PLANTS**

/ Code reference: 025

/ Public
This course is for you if: you are an Engineer, Researcher or Senior Technician; you have a technical and/or scientific background to Bachelors level ('BAC+3') or above.

/ Objective
Based on your prior technical knowledge, you will look in detail at the issue of corrosion in PWRs. You will learn the methods used to identify and characterise corrosion, as well as testing methodologies for developing technical solutions, taking into account their impact on components and overall plant operation.

/ Maximum number of trainees: 24

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**METALLURGY AND PROPERTIES OF ZR ALLOYS FOR NUCLEAR APPLICATIONS**

/ Code reference: 792

/ Public
You are engineer, scientist or technician in charge of fabrication, characterization, application and safety evaluations of Zirconium (Zr) based components for nuclear purposes. 
You are student carrying out specialised studies on materials science and nuclear engineering.

/ Objective
The course will give you an overview of Zr alloys, from their manufacture to their properties for use in nuclear, with a significant amount of time spent on safety aspects. The course starts by reviewing the manufacturing of Zr alloy components, for which you will analyse the behaviour and evolution of the physico-chemical and mechanical properties, under every possible operating condition in normal operation, incident and accident situations.

/ Maximum number of trainees: 25
INTRODUCTION TO USING A SCANNING ELECTRON MICROSCOPE

/ Code reference: 790

/ Public
This course is for you if: you are an Engineer, Senior Technician, PhD Student or Postdoctoral Researcher; you have a technical and/or scientific background.

/ Objective
You will learn the basics for efficient use of a scanning electron microscope, covering the underlying science, a thorough understanding of how they work and how to optimise their use. You will be given practical examples to work on under standard conditions and up to their operating limits.

/ Maximum number of trainees: 4


PHYSICAL AND CHEMICAL CHARACTERISATION OF SURFACES AT DIFFERENT SCALES

/ Code reference: 944

/ Public
You are engineer, scientist, PhD students, post-doc or young professional. You already have got scientific or technical knowledge with a second-cycle academic degree.

/ Objective
Building on your prior scientific knowledge, this advanced course covers the in-depth theory of surface characterisation and provides you with hands-on practice with the different techniques used. You will develop your practical skills at all the stages of characterisation and learn more about the advantages of combining laboratory and X-ray based techniques.

/ Maximum number of trainees: 30
4. OPERATION AND MAINTENANCE OF NUCLEAR FACILITIES
The operation and maintenance of nuclear facilities requires specialist competences spanning the areas of safety, quality, security, risk prevention - in particular fire prevention - and radiation protection.

Drawing on the expertise of the CEA, EDF, IRSN and the major players of the French Nuclear Industry, INSTN’s comprehensive training programme meets nuclear sector needs for training in ventilation, containment structures, physical security and cyber security of sites, management of fire risks and nuclear materials, certification of contractor personnel.

This nationally and internationally recognised expertise is supported by unique Education and Training facilities (Site Training Schools, gloveboxes, telemanipulators, laboratories) which provide trainees with an excellent opportunity to put their newly acquired competences into practice under near real-life industrial conditions.
4. Operation and Maintenance of Nuclear Facilities

**INTEGRATED MANAGEMENT SYSTEM FOR OPERATING A NUCLEAR FACILITY**

/ **Code reference:** 686

/ **Public**
This course is for you if: you manage a nuclear facility, or manage quality and/or safety at a nuclear facility; you have professional experience in the field.

/ **Objective**
The course provides you with a method and tools for putting an integrated management system in place for operating a nuclear facility*. Building on your knowledge of the requirements of the French Decree of 7 February 2012, you will learn to incorporate the Decree requirements into organisational procedures and methodologies. You will link together safety documentation, risk analyses which set the requirements, and the management system which ensures their application. You will also develop your competences in terms of auditing and ensuring compliance of management systems with the Decree.

*In French - installation nucléaire de base (INB)

/ **Maximum number of trainees:** 30

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**COMMON KNOWLEDGE OF NUCLEAR (SCN1, SCN2*), SAFETY-QUALITY OPTION (CSQ*) - INITIAL AND REFRESHER - NUCLEAR REACTOR STREAM**

*In French - SCN - Savoir Commun du Nucléaire; CSQ - Complément Sûreté-Qualité

/ **Code reference:** 36A - 37A - 38A - 39A - 40A - 41A

/ **Public**
This course is for you if: as part of your role as a Contractor or Works Supervisor, you have to work in an EDF Nuclear Power Plant industrial facility (CNPE - Centrale Nucléaire de Production d’Electricité d’EDF), or on key safety components (EIPS - éléments importants pour la sûreté) of a facility; you have completed a mandatory training course in risk prevention.

/ **Objective**
The set of ‘Core Training Courses Common to all Nuclear Contractors’ (CIN - Formations Communes aux Intervenants du Nucléaire), required by the Operator EDF, for certification authorising work at a nuclear power plant, covers all of the mandatory training courses. The programme develops your competences in applying EDF’s specific general regulations for the protection of property, people and the environment, in order to ensure excellent standards of safety, security and quality. There is a choice of programme depending on your activities:
- Common Knowledge of Nuclear (initial and refresher): Level 1 is for all contractors and Level 2 is for works supervisors.
- Safety-Quality Option (initial and refresher): is for those working on key safety components (EIPS).
You will be given hands-on training through case studies and near real-life practice scenarios relevant to your work (Site Training School, accredited by EDF).

/ **Maximum number of trainees:** 12
4. Operation and Maintenance of Nuclear Facilities

GENERAL PRINCIPLES OF NUCLEAR FACILITY VENTILATION

/ Code reference: 254

/Public
This course is for you if: you are a Technician or Engineer; you have professional experience in the facility ventilation sector.

/Objective
The course will provide you with a detailed overview of a ventilation system and its components. You will learn more about how to design ventilation systems and the experimental tools used for incorporating a facility’s parameters into the design of a ventilation system.

/Maximum number of trainees: 12

INTRODUCTION TO WORKING WITH PLUTONIUM AND ACTINIDES

/ Code reference: 020

/Public
This course is for you if: you are a Technician or Engineer working in the nuclear sector, in particular in fuel cycle, and related, facilities.

/Objective
During the course you will acquire the competences required for operating at a facility and handling plutonium and actinides: the different types of ionising radiation, fuel fabrication processes, reactor behaviour, associated risks, required procedures and controls, alpha waste and effluent management regulations.

/Maximum number of trainees: 12
5. CLEANUP, DECOMMISSIONING AND WASTE MANAGEMENT

INSTN has set up a training programme in the field of decommissioning for Technicians and Engineers who want to learn about or improve their current knowledge on the subject. The training courses have been designed in consultation with the key players of the nuclear sector, namely the CEA, EDF and Areva. The trainers themselves are experts and professionals who are involved in major decommissioning projects and works. The training covers current regulations, methods used in on-going or completed projects, and lessons learned.

In the field of waste management, INSTN has set up two training programmes on the technical management of radioactive waste, from reprocessing to storage, via their characterisation, processing and conditioning. The first programme is for those who are new to the field of waste management and want to learn about the specialisation. The second programme is designed for Waste Managers and Officers at nuclear facilities. The trainers are in large part waste management specialists and experts from Andra.

The majority of the training courses include a practical component: technical visits to decommissioning sites, waste processing, conditioning or storage facilities.
5. Cleanup, Decommissioning and Waste Management

RESPONSE AND CLEANUP OFFICER IN RADIOACTIVE ENVIRONMENTS

/ Code reference: TDA

/ Public
This course is for you if: you work for a company or organisation operating in the cleanup and decommissioning sector; you have professional experience in the field.

/ Objective
The course will provide you with the competences required for the role of Response and Cleanup Officer in Radioactive Environments. Building on the principles and procedures of risk management, alongside prior knowledge of cleanup and decommissioning techniques used in the industry, you will learn more about regulations for the protection of workers, whilst looking at different protection techniques.

/ Maximum number of trainees:
Cherbourg-Octeville: 16 - Marcoule: 8

NUCLEAR WASTE MANAGEMENT – INTERNATIONAL SCHOOL IN NUCLEAR ENGINEERING

/ Code reference: 969

/ Public
You are young researchers, PhD students, post-doctorates and engineers from a stakeholder organization of the nuclear value chain. You want to strengthen your scientific nuclear knowledge in a series of topics that are of high importance for the nuclear community. Nuclear Waste Management is one of them.

/ Objective
During the course you will look at the different types of waste, their sources and characteristics. You will acquire a detailed understanding of the various options for nuclear waste management, moving on to focus on the process of cement- and glass-conditioning. Finally, you will assess the different solutions for final storage, looking in particular at the physical, chemical and safety aspects.

/ Maximum number of trainees: 24
DIGITAL APPLICATIONS FOR DECOMMISSIONING

/ Code reference: 52B

/ Public
This course is for you if: you are an Engineer, a Sector or Operations Manager, Project Manager, Project Officer or you use digital tools applied to decommissioning; you have professional experience in the field of nuclear decommissioning.

/ Objective
During the course you will develop your knowledge of digital methods and tools, in current use or under development, in the field of nuclear decommissioning (digitalisation of facilities, simulation of operations and decommissioning scenarios in nuclear environments, use of immersive technologies, etc.). You will then assess the challenges and impacts of digital technologies on future nuclear facility decommissioning projects. By means of a SPOC, followed over a period of several weeks, and validated by a knowledge evaluation, you will learn about the issues and look at industrial examples of digital systems. You will then give a presentation at the end of the course.

/ Maximum number of trainees: 15

MANAGING ASBESTOS AT A NUCLEAR SITE

/ Code reference: 86A

/ Public
This course is for you if: you are a Senior Technician, a Project Engineer or Project Manager in the nuclear sector; you have professional experience in the nuclear field, in particular in radioactivity, the fuel cycle, radiation protection and nuclear waste.

/ Objective
The course will provide you with the competences required for managing asbestos removal works at an operating nuclear facility or those being decommissioned. You will improve your knowledge of the relevant regulations, management of risks related to asbestos, putting procedures in place, operating methods and procedures specific to asbestos removal works, as well as administrative procedures and drafting of specifications for operating or decommissioning activities in the presence of asbestos.

/ Maximum number of trainees: 15
The safety and security of nuclear facilities is of key importance for efficient operation. The CEA has many experts in this field and in nuclear new-build, operation, maintenance and decommissioning of nuclear facilities. INSTN draws on this expertise and experience in our training offer of specialised courses from principles to implementation. For example, our Institute provides a series of training courses for qualified Nuclear Criticality Safety Engineers, with input from criticality experts from the IRSN’s Neutronics and Criticality Safety Department and the CEA’s Criticality Safety Centre.
6. Nuclear Safety and Security

**INTRODUCTION TO NUCLEAR SAFETY AND SAFETY ASSESSMENT**

/ Code reference: 419

/ Public
This course is for you if: you are an Operator, Project manager, or Safety Officer at a nuclear facility; you have professional experience in the nuclear field.

/ Objective
The course will provide you with the basic competences of nuclear safety, safety assessment and safety management at nuclear facilities and research reactors.

/ Maximum number of trainees: 16

**ACCOUNTING FOR HUMAN AND ORGANISATIONAL FACTORS IN HIGH RISK ACTIVITIES**

/ Code reference: 637

/ Public
This course is for you if: you work at a nuclear facility; you have some prior knowledge of nuclear safety and security.

/ Objective
Building on the principles of how individuals and teams function at work, you will look at the issues related to Human and Organisational Factors (HOF) and learn how to incorporate them in safety guidelines for facilities, safety reviews and analysis of events.

/ Maximum number of trainees: 16
6. Nuclear Safety and Security

SITE CRITICALITY SAFETY ENGINEER

/ Code reference: 634

/Public
This course is for you if: you are an Engineer working towards certification as a Site Criticality Safety Engineer (ICC - Ingénieur Criticien de Centre); you have a scientific background in neutronics and/or safety.

/Objective
During the course you will learn the theory and acquire the practical skills essential to the role of Site Criticality Safety Engineer (ICC). You will develop your competences in criticality calculations and criticality safety analysis, and become equipped to participate actively in the operation of facilities with a criticality risk.

/ Maximum number of trainees: 14

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CYBER SECURITY FOR SITES AND FACILITIES

/ Code reference: 994

/Public
This course is for you if: you are responsible for the protection and security of information systems in the nuclear sector; you are responsible for Fire Safety Systems (SSI - Systèmes de Sécurité Incendie), or the protection of assets or facilities. The course is mandatory at the CEA for all Information System Security Officers (ASSI - Agent de Sécurité des Systèmes d’Information) and Security Officers (OS - Officier de Sécurité) at CEA Centres, in Operational Divisions and in departments with a nuclear facility (‘INB’).

/Objective
The course will provide you with an understanding of the role of government bodies and different parties, the applicable standards, the different threat scenarios in relation to industrial systems, and how to manage associated risks through prevention and response procedures for information systems security.

/ Maximum number of trainees: 20
In the context of the energy transition, companies in the energy sector are diversifying their activities into new sectors, including the development of renewable energy projects. Such development requires an understanding of the techno-economics of how energy systems work.

INSTN offers training programmes highlighting the links between renewable energy production systems and electricity distribution management (Smart Grids), as well as the challenges presented by developing the share of renewable energy in the French and global energy mix. These transdisciplinary training courses are based on technical, economic and project management expertise with input from our network of experts at INSTN, the CEA and our energy sector partners.
7. Alternative Energies

RENEWABLE ENERGY ISSUES: SOCIO-ECONOMIC AND SCIENTIFIC ASPECTS

/ Code reference: 938

/ Public
This course is for you if: you are an Engineer or Researcher; you have general knowledge on the subject of renewable energies.

/ Objective
Following an overview of global energy challenges, you will look at the concept of an energy mix and learn more about the different renewable energy solutions from a technology, economics and sociology point of view. You will be given an overview of the challenges and outlook in terms of research and industrial applications.

/ Maximum number of trainees: 15

MANAGING RENEWABLE ENERGY AND ENERGY EFFICIENCY PROJECTS - CP3E*
*In French: CP3E - Conduite de Projets Énergies Renouvelables et Efficacité Énergétique

/ Code reference: 889

/ Public
This course is for you if: you work in the energy sector - industry, institutions or private companies; you have professional experience in the energy sector.

/ Objective
During the course, you will look at the different methods and technologies used in the production of renewable energy and in systems for optimising energy efficiency. You will be given an overview of the challenges involved and their impacts on project implementation, as well as learning about the methodological tools used to ensure the implementation of such projects.

/ Maximum number of trainees: 20
7. Alternative Energies

SAFETY FOR METAL ADDITIVE MANUFACTURING

/ Code reference: 21B

/Public
This course is for you if: you are a Technician, Engineer or Manager at a company involved in the manufacturing of metal powders for additives.

/Objective
The course provides you with an overview of the different technologies used in metal additive manufacturing, as well as covering the associated risks, safety procedures and their effectiveness, and relevant regulations.

/Maximum number of trainees: 11

SMART GRIDS: OPPORTUNITIES, CHALLENGES, PERSPECTIVES

/ Code reference: 056

/Public
This course is for you if: you work in the energy sector - industry, institutions or private companies; you have professional experience in the energy sector and/or energy distribution networks sector.

/Objective
During the course, you will look at operational, technical and economic principles of Smart Grids. The course also covers sociological aspects as part of an overall view of the use of these systems and their impact on energy access. You will use this knowledge to evaluate the different strategies employed by public and private sector organisations, as well as the new economic models required for studying these systems.

/Maximum number of trainees: 20
The regulations state that all personnel whose work involves tasks which could lead to exposure to ionising radiation must complete a specific training course for their activity. This is the case, for example, for Non Destructive Testing operations for which INSTN provides a training programme preparing operators for certification in the use of specialised industrial radiography equipment (CAMARI - *certificat d’aptitude à manipuler des appareils de radiologie industrielle*). INSTN also provides all of the training required under French regulations for the transport of radioactive materials (driver training, safety officer, etc.).

These are hands-on training courses, with practical work and practice scenarios in laboratories and custom-built training facilities which are a close reproduction of those used by Areva NC (NewCo) and EDF nuclear reactors, including the future EPR, in order to provide trainees with near real-life practical training.
8. Radiation Protection of Personnel

PRACTICAL MEASUREMENTS FOR RADIATION PROTECTION

/ Code reference: 064

/ Public
This course is for you if: you are a Technician or Engineer; you have prior knowledge of the basics of radiation protection.

/ Objective
The course will give you the opportunity to practice measuring dose rates or radioactive contamination in a safe, controlled environment. By the end of the course you will be able to explain how radiation protection equipment works, select appropriate radiation protection equipment according to measuring conditions, evaluate measurement methods and the results obtained.

/ Maximum number of trainees: 12

CEFRI* CLASS ‘F’ TRAINING COURSES - ALL RISK PREVENTION STREAMS - INITIAL, GATEWAY, AND REFRESHER

*CEFRI - French Committee for Training Certification and Monitoring of Personnel working with Ionising Radiation


/ Public
This course is for you if: you work in the nuclear field; you have professional experience in operating or maintenance of a facility.

/ Objective
The Risk Prevention training programme includes all of the training courses which develop competences in radiation protection. The courses are specific to your operational context and type of nuclear facility. There are four streams:

• Research Centre
• Nuclear Reactor
• Naval Nuclear Propulsion
• Nuclear Fuel Cycle

During the course you will learn about radiation protection regulations, their interpretation and application in terms of operational requirements and practices. You will carry out practice scenarios in conditions that closely replicate your work activities.

/ Maximum number of trainees: 10
8. Radiation Protection of Personnel

**ADR* - DRIVER TRAINING FOR TRANSPORT OF DANGEROUS GOODS CLASS 7 SPECIALISATION - INITIAL**

*ADR - European Agreement concerning International Transport of Dangerous Goods by Road*

/ Code reference: J32

/ Public
This course is for you if: you drive goods vehicles; you have professional experience in the transport of dangerous goods; you have an ADR Basic Training certificate.

/ Objective
The course covers the regulations and safety management procedures relating to the transport of radioactive materials by road, including implementation of emergency procedures in the event of an accident or incident. The course allows you time to develop your competences through a comprehensive and progressive training programme, adapted to your needs and including practical laboratory work, in line with French Nuclear Safety Authority (ASN) specifications.

/ Maximum number of trainees: 25

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**CERTIFICATION IN THE USE OF SPECIALISED INDUSTRIAL RADIOGRAPHY EQUIPMENT (CAMARI*) - INITIAL, SPECIFIC RENEWAL**

*In French: CAMARI - Certificat d’aptitude à manipuler des appareils de radiologie industrielle*


/ Public
This course is for you if: you work with particle accelerators and are qualified to use specialised industrial radiography equipment (CAMARI); or you have professional experience in the field of industrial radiography but are not certified.

Note: the list of industrial radiography equipment or equipment categories for which a certification (CAMARI) is required is set out in the French Decree of 21/12/2007 enacting the ASN ruling 2007–DC–0074 of 29/11/2007.

/ Objective
The training programme for Certification in the Use of Specialised Industrial Radiography Equipment (CAMARI) includes all of the continuing professional training courses required for working with particle accelerators in compliance with safety and security procedures. During your course you will learn the basics of radiation protection and acquire the competences required for the safe operation of particle accelerators, with knowledge of the relevant security rules and regulations, in preparation for taking a certification or recertification exam (CAMARI; article 21/12/2007).

/ Maximum number of trainees: 12
9. RADIATION PROTECTION PROFESSIONALS

Activities involving the use of radiation sources must be supervised, in all sectors (nuclear, medicine, industry), by professionals who are qualified in radiation protection. INSTN provides training which meets regulatory requirements (PCR: Competent Person in Radiation Protection - Personne Compétente en Radioprotection), as well as courses for specialisation in careers in radiation protection (First Level in Radiation Protection, etc.).

In addition, INSTN offers specialised training courses for updating competences throughout your professional career (detection, regulatory aspects, etc.).
9. Radiation Protection Professionals

**RADIATION PROTECTION BASICS FOR WORKING WITH UNSEALED SOURCES**

/ Code reference: 989

/ Public
This course is for you if: you work with unsealed sources of ionising radiation, in a laboratory or in industry.

/ Objective
During the course you will learn about the origins and interactions of ionising radiation, the effects of radiation on humans, and look at the standard parameters and units used in the field of radioactivity and radiation protection. This course can be completed in preparation for regulatory certification training, such as the ‘Competent Person in Radiation Protection’ courses. Alternatively it can be taken as part of the training for the radiation protection of personnel required by French Employment Laws (articles R4451-47 to R4451-50), if taken alongside training specific to your role or the training course ‘Applied Radiation Protection for Unsealed Sources’.

/ Individual training:

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**FIRST LEVEL IN RADIATION PROTECTION**

/ Code reference: FBR

/ Public
This course is for you if: if you are an employee or job seeker looking for work as a Radiation Protection Officer; you have basic knowledge in the field.

/ Objective
The course will provide you with the competences required for the role of a Field Radiation Protection Officer. Building on the basic principles of calculations used in radiological protection and after looking at the legislations and regulatory context, you will learn about individual and collective protection methods and equipment, as well as how to conduct routine radiological inspections.

/ Maximum number of trainees: 16
COMPETENT PERSON IN RADIATION PROTECTION (PCR) LEVELS 2 & 3 - ‘INDUSTRY’, ‘TRANSPORT OF RADIOACTIVE SUBSTANCES’, ‘NUCLEAR REACTOR’, ‘LABORATORIES, FACTORIES, WASTE MANAGEMENT SITES’ SECTORS


/Public
This course is for you if: if you work in the nuclear field; you have been appointed to the role of PCR or you already have a PCR certificate to a level corresponding to your professional role.

/Objective
During the course you will acquire or refresh the competences required for the role of Competent Person in Radiation Protection (PCR - Personne Compétente en Radioprotection) depending on the level, sector and stream selected:

• PCR - Level 2 - Industry Sector - Unsealed Sources Stream
• PCR - Level 2 - Industry Sector - Sealed Sources Stream
• PCR - Level 2 - Industry Sector Sealed Sources Stream and Unsealed Sources Stream
• PCR - Level 2 - Transport of Radioactive Substances Sector
• PCR - Level 3 - Nuclear Reactor Sector
• PCR - Level 3 - Laboratories, Factories, Waste Management Sites Sector

/ Maximum number of trainees: 12

RADIOLOGICAL RISK ANALYSIS USING DOSIMEX TOOL

/ Code reference: 983

/Public
This course is for you if: you are a Safety Officer, Project Engineer, Technician, Senior Technician in Radiation Protection, PCR certified, a Nuclear Medicine Physician or Radiologist; you have basic knowledge in radiation protection.

/Objective
During the course you will learn how to characterise a radiation source (gamma, X-rays, bremsstrahlung ‘braking’, beta, neutron radiation), and identify radiological risks: external exposure to gamma, beta or neutron radiation; internal exposure, contamination, etc. You will also learn how to collect appropriate data for input in the Dosimex 2.0 software package, to interpret the results with respect to the regulations, and determine the type and amount of protection required. The topics covered serve to emphasise the main parameters used in radiation protection.

/ Maximum number of trainees: 12
The technological revolution that has swept through the Health sector in recent decades has brought noticeable clinical advantages and is based on innovative and transdisciplinary developments in diagnostic and therapeutic procedures. Coupled with a commitment to improving safety and quality standards, this revolution requires training to support sector professionals by providing them with new competences. Highly specialised training programmes have been designed, for Health sector researchers and professionals, in the fields of Biomedical Imaging and therapy using ionising radiation, for an effective training offer adapted to your professional activities. These training courses are based around innovative educational tools and make full use of the technological platforms and facilities available at the CEA, including our virtual reality studio for radiotherapy and DOSEO.
10. Nuclear Applications in Human Health

RESEARCH AND MEDICAL APPLICATIONS OF RADIOPHARMACEUTICALS - EUROPEAN RADIOPHARMACY COURSE (BLOCK 3)

/ Code reference: 823

/ Public
This course is for you if: you are a Resident or professional Pharmacist, a Lab Researcher, Engineer, Chemist or Biochemist; you have professional experience in the nuclear medicine field.

/ Objective
The course will provide you with the knowledge and skills to produce radiopharmaceuticals for research and/or clinical applications in nuclear medicine. The course explains the uses of radiopharmaceuticals, from which you will learn about their preparation and the methodologies used to determine and mitigate the risks associated with their use.

/ Maximum number of trainees: 12

APPLIED METROLOGY FOR IN VIVO IMAGING

/ Code reference: 51B

/ Public
This course is for you if: you are a Researcher, Engineer, a Doctor, a PhD Student or Postdoctoral Researcher, working with clinical or preclinical imaging equipment (MRI, PET, ultrasound) and familiar with using these methods for biological or medical studies.

/ Objective
During the course you will acquire competences in metrology applied to imaging, learning about the general theory of measurements (observable variables, dependent variables, absolute and relative errors, uncertainty, measurement quality, '5 Whys* - 'Règle des 5M' - milieu, main d'oeuvre, matières, matériel ou machine, méthodes) and applying good practices in metrology to the production of images (set-up procedures for image acquisition, image acquisition phase, image processing, extraction of parameters from an image, presenting your results in a scientific publication).

/ Maximum number of trainees: 15
IN VIVO OPTICAL IMAGING: WHICH TECHNIQUE FOR WHICH USE?

/ Code reference: 13B

/ Public
This course is for you if: you are a Senior Technician, an Engineer, PhD Student or Researcher; you have experience in optical imaging.

/ Objective
During the course you will learn how to use optical imaging in your research. Building on the principles of in vivo optical imaging and an overview of current techniques, you will look at which criteria to consider when choosing an in vivo optical imaging technique, and learn how to use it effectively for your specific research purposes. You will develop your practical skills in operating the equipment, analytical skills for interpreting the results and communication skills for presenting your results effectively.

/ Maximum number of trainees: 9

MEASURING DOSE IN STEREOTACTIC RADIOThERAPY

/ Code reference: 38B

/ Public
This course is for you if: you are a Medical Physicist, Radiotherapy Technician, an Engineer, Researcher or PhD Student in Medical Physics.

/ Objective
During the course you will look at the issues related to the dosimetry of minibeam radiotherapy used in stereotactic irradiation. By the end of the course you will be able to select and apply appropriate measuring techniques for these procedures.

/ Maximum number of trainees: 14
11. MICRO AND NANOTECHNOLOGIES

The micro and nanotechnologies sector is developing rapidly, affecting a wide range of industries. New applications of nanotechnologies are being discovered every day, in sectors as diverse as Electronics, Health, Energy, Materials and Defence, alongside their associated social and safety dimensions. INSTN’s training offer is continually updated in line with developments in micro and nanotechnologies. Our training programme covers the whole value chain: from materials through components to processes, and all the stages from design to product uptake. Our courses emphasise the transdisciplinary nature of the micro and nanotechnologies field. Case studies and practical sessions, in particular in a cleanroom, allow you to put theory into practice.
11. Micro and Nanotechnologies

NANO: OBJECTS AND TECHNOLOGIES

/ Code reference: NOT

/ Public
This course is for you if: you are a Senior Technician, Engineer or Researcher; you have a qualification in Biology, Chemistry, Design, Electronics, Physics, or Technology.

/ Objective
During the course you will learn about generic nanoscale technologies, so as to be able to innovate collaboratively in the sector in the near future.

/ Maximum number of trainees: 12

SYSML FOR SYSTEMS ENGINEERING WITH PAPYRUS

/ Code reference: 33B

/ Public
This course is for you if: you are an Engineer, Researcher, or an experienced Technician, who models systems; you have a solid technical foundation in Systems Engineering.

/ Objective
The course will provide you with the competences required for using the different SysML display options (diagrams and tables), generating complementary and coherent sets of viewpoints in order to view different aspects of the same complex system. You will then put these competences into practice using the Papyrus modelling tool.

/ Maximum number of trainees: 10
**NANOCHARACTERISATION FOR STUDYING MATERIALS AND STRUCTURES**

/ Code reference: 613

/ Public
This course is for you if: you are a Senior Technician or Engineer; you have professional experience in the field of micro- and nanotechnologies.

/ Objective
During the course you will learn about the techniques used in materials characterisation, and be able to select and use the most appropriate techniques for your projects studying surfaces and interfaces, nanomaterials and nanostructures.

/ Maximum number of trainees: 12

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**NANOMATERIALS RISK MANAGEMENT - NANOPREV**

/ Code reference: 939

/ Public
This course is for you if: you work in industry, for a research institution, or a public institution; you have professional experience in risk analysis.

/ Objective
The course will provide you with the competences required to ensure the health and safety of workers in the nanomaterials sector. By the end of the course you will be able to identify and evaluate potential risks associated with the activities carried out by workers.

/ Maximum number of trainees: 12
One of the key features of nuclear is its radioactivity and the resulting production of ionising radiation. The physics of the different types of radiation, their interactions with the environment and their detection are common to all applications of nuclear for health and for energy production.

INSTN has facilities for handling radioactive sources and measuring their radioactivity. Specialists explain how they monitor a facility, the environment, workers and the public using scientific methods.
12. Radioactivity and the Environment

**INTRODUCTION TO RADIOACTIVITY**

/ Code reference: 494

/Public
This course is for you if: you are interested in learning more about the subject.

/Objective
This course will provide you with the basic concepts of radioactivity and ionising radiation, including the parameters and units used for radioactivity, as well as the links between them.

/Maximum number of trainees: 18

**DETECTION OF IONISING RADIATION**

/ Code reference: 047

/Public
This course is for you if: you are a Technician or an Engineer; you have basic knowledge in the field.

/Objective
During the course, you will learn how to measure radiation emitted by radioactive sources, looking at detection methods and their inherent limitations. You will also learn how to implement detection procedures.

/Maximum number of trainees: 16
12. Radioactivity and the Environment

**DETECTON MEASUREMENTS - UNCERTAINTIES, DECISION THRESHOLDS AND DETECTION LIMITS**

/ Code reference: 573

/ Public
This course is for you if: you are a Technician or an Engineer working on research projects involving radionuclides at quantities at the limit of detection; you have a background in scientific measurements.

/ Objective
During the course you will look at how decision thresholds and detection limits are defined and used, putting them into practice in measuring radioactivity using standard techniques: gamma, alpha spectroscopy, etc. The course covers the ISO 11929 standard.

/ Maximum number of trainees: 15

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**LIQUID SCINTILLATION TECHNIQUES FOR MONITORING**

/ Code reference: 045

/ Public
This course is for you if: you are a Laboratory Technician or an Engineer; you have professional experience in environmental monitoring.

/ Objective
This course teaches you how to use a liquid scintillation counter, how to optimise measurements for low radioactivity samples, as well as interpreting and presenting the results.

/ Maximum number of trainees: 12
Starting a PhD, becoming a Postdoctoral Researcher, or starting a career in Science or Technology requires personal and professional commitment and relies on development of transferable competences in communication and project management. Management of science and technology projects also requires competence in the field of technology transfers, in order to ensure uptake of innovative technologies by industry.

We offer a wide range of training, from introductory to advanced courses, using innovative methods for learning, such as Business Games and Case Studies.
13. Professional Development for Careers in Science

**DESIGN EFFECTIVE PRESENTATIONS AND TRAINING SESSIONS**

/ Code reference: 376

/Public
This course is for you if: you work at a research or training institution; you have professional experience in scientific communication.

/Objective
This course will provide you with the keys to effective communication and knowledge sharing, covering all the stages of a seminar or training course, from design through to end-of-course evaluation by trainees, following a systematic approach.

/ Maximum number of trainees: 12

**PLANNING YOUR PHD AND FUTURE CAREER**

/ Code reference: 603

/Public
This course is for you if: you are a first year PhD Student.

/Objective
During the course you will learn how to get the most out of your PhD, with a view to your future career, and how to promote its value when applying for jobs in France or abroad.

/ Maximum number of trainees: 12
13. Professional Development for Careers in Science

// BUSINESS 101 FOR EARLY CAREER RESEARCHERS

/ Code reference: 766

/ Public
This course is for you if: you are a PhD Student (2nd or 3rd year) or a Postdoctoral Researcher.

/ Objective
By means of a Business Game, you will look at the fundamentals of business (principles, vocabulary, role of innovation, role of researchers, etc.), which will contribute to a smooth start in your first job, whether in an industrial sector, or other type of business.

/ Maximum number of trainees: 15

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// PLANNING AND MANAGING SCIENTIFIC PROJECTS

/ Code reference: 081

/ Public
This course is for you if: you are a PhD Student (2nd or 3rd year), Postdoctoral Researcher, or an Early Career Researcher.

/ Objective
This course will provide you with the methods and tools for optimising your research projects, and further developing your skills in effective management of successful scientific projects, a key competence required, in particular, by industry.

/ Maximum number of trainees: 12
TRAINING OFFER - ONLINE CATALOGUE

INSTN has an online catalogue of courses grouped under five main fields of training, which is updated on a daily basis and can be downloaded from our website’s ‘Search for a Training Course’ menu:

- Nuclear and Energy Sciences
- Radiation Protection and Nuclear Applications in Human Health
- Micro and Nanotechnologies
- Cross-Functional Scientific and Technical Competencies
- Careers in Science

All of INSTN’s Continuing Professional Training course information sheets are available on our website: www-instn.cea.fr

An interactive calendar listing all of our current and future training sessions can also be found on our homepage: www-instn.cea.fr/formations/formations-continues/calendrier-des- formations.html

For more information contact us at: formation-professionnelle-instan@cea.fr