

Language :	English
Place of the course	Autre site
Prerequisites	<p><b>Part 1:</b> basic knowledge of radiation and nuclear installations, basic knowledge of the nuclear history and of the current state of affairs in nuclear R&amp;D, industry and policy</p> <p><b>Part 2:</b> basic knowledge of radiation and nuclear installations</p> <p><b>Part 3:</b> The BNEN course 'Nuclear Energy: Introduction' is a prerequisite</p>
Main themes	<ul style="list-style-type: none"> <li>• Part 1: Nuclear &amp; Radiological Risk Governance ' a critical exploration of theory and practice</li> <li>• Part 2: Safety Culture</li> <li>• Part 3: Nuclear Safeguards &amp; Security</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p><b>Part 1: Nuclear &amp; Radiological Risk Governance ' a critical exploration of theory and practice.</b></p> <p>The student should gain insight into the various theoretical understandings of risk governance as a policy process and be able to assess current practices (nuclear energy policy, climate change policy, policy wrt medical applications, ') against these theoretical views. In particular, the student should develop an understanding of the working of science in the context of risk governance and be able to develop an own critical opinion with respect to the political and ethical aspects of practices of nuclear &amp; radiological risk governance. In addition, the student should be able to undertake critical readings of existing regulation and recommendations with regard to radiological protection and safety culture (historical development, political dimensions, considerations on accountability, ').</p> <p>1 <b>Part 2: Safety Culture.</b></p> <p>The student should be aware of the organisational, the human and the technical dimensions of safety. The student should be familiar with the cultural aspects of safety. The student should be capable to assess some safety culture characteristics and factors. The student should understand the importance of an adequate integrated management system and the concept of processes.</p> <p><b>Part 3: Nuclear Safeguards &amp; Security.</b></p> <p>The student should understand the difference in content, legal background and technical implementation of safety, safeguards and security. The student should be able to derive the appropriate statistical test for the 3 safeguards goals. The student should be able to identify proliferation sensitive technologies, how these are dealt with in international trade. The student should be aware of nuclear security measures and detection techniques used at border control.</p>
Evaluation methods	<p>Part 1: oral examination on 20 points</p> <p>Part 2: oral examination on 20 points</p> <p>Part 3: Written examination, on 20 points, 12 points for theory, 8 points for exercise.</p>
Content	<p><b>Part 1: Nuclear &amp; Radiological Risk Governance ' a critical exploration of theory and practice.</b></p> <p>The overall aim of this part is to provide better insight into the complexity of nuclear risk governance and to discuss as well the moral foundations for risk governance as the practical implications for research and policy. The course will start with basic reflections on risk perception and risk justification and will also discuss specific case studies in this respect. Based on these considerations, together with the students, a normative view on the 'method of risk justification and governance' in societal context (as compared to the occupational context) will be constructed. Consequently, this 'normative view on method' will be used to asses current understandings of radiological protection and safety culture (as outlined in existing recommendations and regulations). A last part will concentrate on existing and emerging advanced scientific methods ('technology assessment', 'science &amp; technology studies', 'mode-2 science', 'transdisciplinarity', ') that would support a more deliberate dealing with risk governance in research and policy.</p> <p><b>Part 2: Safety Culture.</b></p> <p>The course shall include a synthesis of the safety culture and integrated management systems points of view of the IAEA. Particular attention will be given to safety culture assessment, its pitfalls and its use in daily practice (case discussions). To anticipate the third part on Safeguards and Security, some discussion</p>

	<p>about the cultural aspects of safety and security will be presented. The organisational aspects of safety management as part of the management of the entire company within an integrated management system will be presented.</p> <p><b>Part 3: Nuclear Safeguards &amp; Security.</b></p> <p>The legal background and the technical measures, necessary to guarantee peaceful use of nuclear energy are explained with a historical overview. The international and regional framework for inspectorates, their goals and detection tools are described, firstly for safeguards of nuclear material and secondly for non-proliferation of nuclear technology. The latter touches upon the Nuclear Suppliers Group and export control with dual-use list and trigger list. Nuclear security will be addressed with examples of detectors and radiation portal monitors used at border control.</p>
<p>Inline resources</p>	<p><a href="https://www.sckcen.be/fbnen">https://www.sckcen.be/fbnen</a></p>
<p>Bibliography</p>	<p>Part 1: Lecture slides + a reader with key scientific papers</p> <p>Part 2: A syllabus will be prepared based on IAEA documents: Safety Series INSAG 4 ' 15; IAEA TECDOC 1329; IAEA General Standard GS-R-3; GS-G-3.1; GS-G-3.5</p> <p>Part 3: Nuclear Safeguards and Non-Proliferation (2008), ed. G. Janssens-Maenhout, syllabus of the ESARDA course, ISBN-10: 3844363300</p> <p>For safety culture: Michel Llory, René Montmayeul, 'L'accident et l'organisation', Ed. Préventique, Bordeaux, 2010; ISBN 978-2-911221-47-8 IISN 1275-7144</p> <p>Material available via the Trasnusafe project (under development)</p>
<p>Other infos</p>	<p>This course is part of the Advanced Master programme in nuclear engineering organized by the Belgian Nuclear Higher Education Network (BNEN). BNEN is organised through a consortium of six Belgian universities and the Belgian Nuclear Research Centre, SCK-CEN and takes place at the SCK-CEN in Mol.</p> <p>Prof. Frank Hardeman ' Université Catholique de Louvain-la-Neuve</p> <p>Prof. Greet Janssens-Maenhout ' Universiteit Gent</p> <p>Gaston Meskens ' SCK-CEN</p>
<p>Faculty or entity in charge</p>	<p>EPL</p>

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Advanced Master in Nuclear Engineering	GNUC2MC	3		