



3.00 credits

Q1

Language :	English
Place of the course	Autre site
Prerequisites	Bachelor level lectures on physics, mechanics, mathematics.
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>1</p> <ul style="list-style-type: none"> <li>• To learn and understand the basic properties of a nucleus</li> <li>• To understand the role of conservation laws in decay processes and reactions</li> <li>• To learn particles interactions with matter</li> <li>• To learn characteristics of main particles detectors</li> </ul>
Evaluation methods	Written examination (closed book)
Teaching methods	<ul style="list-style-type: none"> <li>• 2 t.m. ; 36 hours of lectures, 5 lab sessions of ½ day</li> <li>• laboratory work (SCK.CEN)</li> </ul>
Content	<ul style="list-style-type: none"> <li>• Nuclear properties (nuclear radius; mass and abundance of nuclides; nuclear binding energy; nuclear excited states)</li> <li>• Radioactive decay law, radioactive chains, units of radioactivity</li> <li>• Alpha, Beta and Gamma decay</li> <li>• Nuclear fission</li> <li>• Types of nuclear reactions: compound nucleus, threshold reactions, concept of cross section</li> <li>• Interactions of ionizing radiations (ions, electrons, photons, neutrons) with matter</li> <li>• Detection of ionizing radiations (ions, electrons, photons, neutrons)</li> </ul>
Inline resources	<a href="https://www.sckcen.be/fbnen">https://www.sckcen.be/fbnen</a>
Bibliography	<p>The PowerPoint presentations of the lectures are available on the BNEN website.</p> <p>Other useful references:</p> <p>Krane, K.S. 'Introductory Nuclear Physics', Wiley, 1987.</p> <p>Tavernier, S. 'Experimental techniques in nuclear and particle physics', Springer-Verlag, 2010.</p> <p>Knoll, G.F. 'Radiation detection and measurement', 4 ed., Wiley, 2010.</p>
Other infos	<p>Prof. Nicolas Pauly Université Libre de Bruxelles</p> <p>Course location: SCK-Cen (Mol)</p>
Faculty or entity in charge	EPL

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mechanical Engineering	MECA2M	3		
Advanced Master in Nuclear Engineering	GNUC2MC	3		
Master [120] in Electro-mechanical Engineering	ELME2M	3		