




3.00 credits

22.5 h + 7.5 h

Q1

Teacher(s)	Froment Pascal ;
Language :	French > English-friendly
Place of the course	Louvain-la-Neuve
Main themes	The aim of the course is threefold - present an extended knowledge of the atomic nucleus, stable and unstable, in order to master the theoretical concepts and the various applications related to isotopes, radioactivity and nuclear reactions ; - give a fundamental understanding of the interactions between radiations and matter, with their chemical and biological consequences and applications to radioprotection ; - provide firm basis to appreciate the problem of energy supply by nuclear ways.
Learning outcomes	At the end of this learning unit, the student is able to : The aim of the course is threefold : 1 - present an extended knowledge of the atomic nucleus, stable and unstable, in order to master the theoretical concepts and the various applications related to isotopes, radioactivity and nuclear reactions ; - give a fundamental understanding of the interactions between radiations and matter, with their chemical and biological consequences and applications to radioprotection ; - provide firm basis to appreciate the problem of energy supply by nuclear ways.
Evaluation methods	The exam contains theoretical questions to discuss and exercises to solve.
Teaching methods	Lectures, exercices and visits related to radioactivity will be provided
Content	1. Stability of atomic nuclei, radioactivity and nuclear disintegrations. 2. Introduction to the standard model in nuclear physics 3. Production of radioelements: nuclear reactions and irradiation conditions 4. Measurement of radioactivity 5. Chemical and biological effects, dosimetry of radiations 6. Production of energy : nuclear fission and fusion 7. Applications of nuclear chemistry: isotopic exchange; use of radioactive tracers in chemistry; labelled molecules in biology and nuclear medicine; datation methods.
Bibliography	Deux livres de référence seront principalement utilisés: <ul style="list-style-type: none"> • Radiochemistry and Nuclear Chemistry de G. Choppin (2002) • Nuclear and Radiochemistry de K. Lieser (2001).
Other infos	Prerequisite : - Basic notions in general and physical chemistry (1st and 2nd year of a bachelor degree) are needed.
Faculty or entity in charge	CHIM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemistry	CHIM2M	3		
Master [60] in Chemistry	CHIM2M1	3		
Certificat universitaire en radiopharmacie	RFAR9CE	3		
Master [120] of Education, Section 4 : chemistry	CHIM2M4	3		