




3 credits

22.5 h + 7.5 h

Q1

|                             |  |
|-----------------------------|--|
| Teacher(s)                  | Froment Pascal ;   |
| Language :                  | French   |
| 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.  |
| Aims                        | <p>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.</p> <p>1</p> <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p> |
| 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. Teaching methods Lectures, exercices and visits related to radioactivity will be provided   |
| Other infos                 | Prerequisite Basic notions in general and physical chemistry (1st and 2nd year of a bachelor degree) are needed. Support : Radiochemistry and Nuclear Chemistry by G. Choppin (2002) and Nuclear and Radiochemistry by K. Lieser (2001).   |
| Faculty or entity in charge | CHIM   |

| <b>Programmes containing this learning unit (UE)</b> |                         |         |              |   |
|--|-------------------------|---------|--------------|---|
| Program title  | Acronym                 | Credits | Prerequisite | Aims  |
| Master [120] in Chemistry                            | <a href="#">CHIM2M</a>  | 3       |              |  |
|  | <a href="#">RFAR9CE</a> | 3       |              |  |
| Master [60] in Chemistry                             | <a href="#">CHIM2M1</a> | 3       |              |  |