UNIVERSITÀ DI PAVIA

## Anno Accademico 2017/2018

# INTRODUCTION TO RADIATION PROTECTION

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| **Enrollment year** | 2016/2017 |
| **Academic year** | 2017/2018 |
| **Regulations** | DM270 |
| **Academic discipline** | FIS/07 (APPLIED PHYSICS (CULTURAL HERITAGE, ENVIRONMENT, BIOLOGY AND MEDICINE)) |
| **Department** | DEPARTMENT OF PHYSICS |
| **Course** | |
| **Curriculum** | Fisica biosanitaria |
| **Year of study** | 2° |
| **Period** | 2nd semester (01/03/2018 - 15/06/2018) |
| **ECTS** | 6 |
| **Lesson hours** | 48 lesson hours |
| **Language** | Italian |
| **Activity type** | ORAL TEST |
| **Teacher** | GIROLETTI ELIO (titolare) - 6 ECTS |
| **Prerequisites** | Notions about electric, magnetic and electromagnetic fields; electromagnetic wave spectra and their properties; atom structure and nuclear particles; radioactive decay; radioactive families; ionizing radiation interaction with matter. |
| **Learning outcomes** | At the end of the course the student should manage the basic and physical concepts related to the protection against ionizing radiations and also the principles of radiation protection of workers, patients and the population. The student should know also the basic principles stated by the International Commission on Radiological Protection as well as the legal features about radiation protection. |
| **Course contents** | The main topics are: physical aspects of radiation protection; possible detriments of ionizing radiations; external and internal exposure; radiometric quantities; the radiation protection system; radiation |

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| | protection quantities; individual dose limits; radiation protection practical aspects and safety procedures: exposure length, source distance and radiation shielding; protection from internal contamination; artificial sources used in industry, research and medicine; natural sources (radon, NORM, TeNORM, cosmic rays); international and national organization about radiation protection; European directives and Italian law. |
| **Teaching methods** | Classical lectures followed by exercises. A visit to some radiological plants complete the course. |
| **Reccomended or required readings** | - Pelliccioni M, Fondamenti fisici della radioprotezione, ed. Pitagora, Bologna, 1990<br>- Vergine A.L, Giroletti E, Radiazioni ionizzanti: protezione dei lavoratori, della popolazione e dei pazienti, ed. Esse Libri, 2003<br>- Course slides available at UniPv KIRO web-page- Shapiro J, A radiation protection guide for scientists and physicians, Harvard university press, IVth ed.<br>- Martin E, Physics for Radiation Protection, Wiley-Interscience, 2000<br>- Knoll G.F., Radiation detection and measurement, J. Wiley, last edition<br>- Johns H. E, Cunningham J. R, The physics of radiology, Springfield, Charles Thomas Publ, III edition, 1987<br>- Attix, Introduction to Radiological Physics and Radiation Dosimetry, Book seller<br>- Dorschel B, Schuricht V, Stener J, The physics of radiation protection, Nuclear Technology Publ., Asford, 1996<br>- Delacroix D. et al., Radionuclide and radiation protection data Handbook 2002, Rad. Prot. Dosim., vol.98: 1, 2002<br>- Shleien B., The health physics and radiological health handbook, Silver Spring, MD, 1992 rev. ed.<br>- International Commission on Radiological Protection publications, www.icrp.org<br>- National Council on radiation protection reports, www.ncrp.orgCourse slides provided by the teacher |
| **Assessment methods** | Oral exam about all the course topics. We recommend students to focus particularly on theoretical aspects and on methodology facing the typical radiation protection scenarios, such as: internal contamination, external dosimetry, shielding calculations, radiation monitors, radiation protection quantities, etc. Usually no calculations are required |
| **Further information** | Oral exam about all the course topics. We recommend students to focus particularly on theoretical aspects and on methodology facing the typical radiation protection scenarios, such as: internal contamination, external dosimetry, shielding calculations, radiation monitors, radiation protection quantities, etc. Usually no calculations are required |
| **Sustainable development goals - Agenda 2030** | $lbl_legenda_sviluppo_sostenibile |