COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	PHYSICS DEPARTMENT		
LEVEL OF STUDIES	GRADUATE		
COURSE CODE	**219**	**SEMESTER**	**6,8**
COURSE TITLE	MEDICAL PHYSICS - RADIOPHYSICS		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	4	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background / Skills development
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Medical Physics is a branch of Applied Physics that focuses on the application of the principles, laws and methods of Physics to the study of the functioning of the human body (in physiological and pathological conditions) and in the provision of health services. In particular, this course focuses on the actions of ionizing radiation on the human body. The aim is to gain an introductory knowledge of the principles and laws of Ionizing Radiation Physics as well as relevant organology.

Upon the successful completion of the course the student will be able to understand:

- The methods of producing ionizing radiation, the ways they interact with matter (with emphasis on the human body), and the ways we evaluate the energy absorbed in it by focusing on imaging and healing.
- The basic principles, methodology and organology of imaging techniques using ionizing radiation (radiology, nuclear medicine and radiation-guided operations)
- The basics, methodology and organology in the treatment of certain diseases, such as cancer.
- The basic radiological principles needed to understand the uses of ionizing radiation and the consequences of nuclear accidents.
- The basic principles and methods of radiation protection as applied in everyday practice.

- The scope and importance of physics applications in the biological sciences, having their first contact with the subject of the work in health and radiation protection facilities.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

Working in an interdisciplinary environment, such as that of Medical Radiophysics (eg in health care units, in the manufacturing industry and in the marketing of medical devices, in nuclear installations) requires searching, critical understanding and synthesis of general principles, knowledge and data from different subjects (eg Physics, Technology, Computer Science, Mathematics and Medicine).
Therefore, analytical, synthetic and critical thinking, ability to solve complex problems, make decisions in a very limited time, be organized and interact with a large number of people with very different characteristics and respect their diversity.
The elements must be combined with high professional, social, and ethical responsibility, due to the high impact of accidental errors.

(3) SYLLABUS

Physical and Medical Relation Production and interaction of ionizing radiation with matter in the light of the needs of the subject - Dosimetry of ionizing radiation and detectors - Elements of biological action of radiation on humans - Elements of Physics in Radiation Diagnosis and Radiographically Guided Actions -Products of Nuclear Medicine Physics (diagnostic and therapeutic applications) - Elements of physics in the treatment of the use of ionizing radiation - Philosophy and principles of radiation protection -Patient protection, health, public and ecosystem workers - The profession of radiation physicist
The main lectures are combined with experimental training, demonstration of relevant provisions, visits to health care providers and special lectures on related topics (eg nuclear accidents, ethics in health professions).

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to Face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Laboratory exercise, demonstrations, direct communication and online tutor-learner

TEACHING METHODS

The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	***Semester workload***
Lectures	20
Laboratory	7
Demonstrations-study visits-field exercise	13
Special Lectures	7
Task writing	5
Exams	3
Non-guided study hours	20
Total	**75**

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Assessment of the achievement of the objectives is done by combining the performance of the trainee in the laboratory exercise (SW 20%) in the written examination (SW 80%), which is done in Greek, while the student has access to relevant educational material. The written examination is a combination of multiple choice questions, comprehension questions and practical application of the subjects to which he was exposed in the course of his training and solving practical problems that do not require complex mathematical tools, but mainly analytical and synthetic thinking.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

- Γεωργίου Ε, Γιακουμάκης Ε, Δημητρίου Π,Καραΐσκος Π, κα: Ιατρική Φυσική: Διαγνωστικές & Θεραπευτικές Εφαρμογές των Ακτινοβολιών (2η έκδοση) BrokenHillPubl. Ltd, Αθήνα 2013 [Εύδοξος 32997826]
- Καλέφ-Εζρά Τ. Στοιχεία ακτινοπροστασίας στην Ιατρική, 3ηέκδοση,Ιωάννινα, 2009
- CemberH, JohnsonT: Introduction to Health Physics, McGraw Hill Medical, New York, 2009
- IAEA (Podgorzak BE et al) :Review of radiation oncology physics: a handbook for teachers and students, International Atomic Energy Agency, Vienna, Austria, 2003
- IAEA (Bailly et al):Nuclear Medicine Physics: a handbook for teachers and students, International Atomic Energy Agency, Vienna, Austria, 2014