(1) GENERAL

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>NATURAL SCIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADEMIC UNIT</td>
<td>BIOLOGY</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>UNDERGRADUATE</td>
</tr>
<tr>
<td>COURSE CODE</td>
<td>BIO ΣΤΒ2</td>
</tr>
<tr>
<td>SEMESTER</td>
<td>6/8</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>RADIOBIOLOGY</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>WEEKLY TEACHING HOURS</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURES</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

COURSE TYPE
Field of Science (Radiobiology)

PREREQUISITE COURSES:
There are not prerequisite courses

LANGUAGE OF INSTRUCTION and EXAMINATIONS:
Greek. Teaching could be performed in English, in case foreign students attend the course.

IS THE COURSE OFFERED TO ERASMUS STUDENTS:
Yes

COURSE WEBSITE (URL)
https://eclass.upatras.gr/courses/BIO253/

(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

By the end of this course the student should be able to:
• Recognize the types of ionizing radiations
• Know the most important sources of ionizing radiations
• Describe the modes of radiation interactions with matter
• Explain the difference in range of the different types of ionizing radiations
• Know the main interaction products between radiation and matter
• Have a concise knowledge of radiation quantities and their Units
• Describe the advantages and disadvantages of each detector and choose the most appropriate detector for a specific use
• Describe the advantages and disadvantages of the most widely used dosimeters
• Have a concise knowledge on the basic concepts of nuclear reactors operating, of nuclear weapons, accidents happened and their environmental consequences
• Know the effects of ionizing radiation on live organisms
• Manipulate safely radiotracers and know when and how can man use them

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

By the end of the course the student will have further developed the following skills/competences:

• Ability to demonstrate knowledge and understanding of essential facts, concepts and principles relating to Radiobiology
• Ability to apply such knowledge for solution of qualitative and quantitative problems of the familiar field
• Study skills needed for continuing professional development
• Ability to interact with others on multidisciplinary problems

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):

• Searching, analysis and synthesis of facts and information, as well as using the necessary technologies
• Adaptation to new situations
• Decision making
• Autonomous (Independent) work
• Exercise of criticism and self-criticism
• Promotion of free, creative and inductive thinking
• Respect to natural environment

Work design and management


• Dosimetry: Radiation Quantities and Units. Measurement of exposure of Dose, Dose Equivalent and Exercises. Measurement of Dose by films, TLDs, pocket dosimeter, monthly inventory and recommended limits of Dose Equivalent

• Types of radiation detectors: ionization chamber, proportional counter, Geiger-Müller counter, scintillation detectors, semiconductor detector HPGe, liquid scintillation detector, methods correcting quenching

• Nuclear Energy and Environment: Principles of operation and types of nuclear reactors, accidents, nuclear weapons, environmental consequences


Lectures face to face

Use of Information and Communication Technologies (ICTs) (e.g. PowerPoint, video etc.) in teaching. The lectures content of the course for each chapter, all problems, in the form of a series of ppt files, and announces are uploaded on the internet, from where the students can freely download them.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Semester workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (2 conduct hours per week × 13 weeks)</td>
<td>26</td>
</tr>
<tr>
<td>Hours for private study of the student and optional problems solving given in each lecture</td>
<td>46</td>
</tr>
<tr>
<td>Final written examination at the end of semester (3 conduct hours × 1 time)</td>
<td>3</td>
</tr>
</tbody>
</table>

Course total | 75 |

1. At the end of the semester there is a final written examination with multiple choice questions and short answer questions (open text books). Minimum passing grade: 5

Optional delivery of solved problems (at least 2) each week, given in each lecture. Addition of 1 grade to the final exam grade (if it’s higher than 5) of the students who have delivered all the solved problems and the percentage of the unit to the others, according to the number of solved problems each person has delivered.
- Suggested bibliography:
  3. "ΚΛΙΝΙΚΗ ΡΑΔΙΟΒΙΟΛΟΓΙΑ», Γ. Α. Πλατανιώτης, Εκδ. UNIVERSITY STUDIO PRESS, Θεσσαλονίκη 2000
  4. "AN INTRODUCTION TO RADIOBIOLOGY", A. H. W. Nias, 2nd Edn, JOHN WILEY & SONS, Baffins Lane, 1998
  6. "ΡΑΔΙΟΒΙΟΛΟΓΙΑ, Ακτινοβολίες και Ζωή", Λ. Χ. Μαργαρίτης, Εκδ. Θεμέλιο, Αθήνα 1996
  8. "ΔΟΣΙΜΕΤΡΙΑ ΚΑΙ ΒΙΟΛΟΓΙΚΕΣ ΕΠΙΠΤΩΣΕΙΣ ΤΩΝ ΑΚΤΙΝΟΒΟΛΙΩΝ", Σ. Χαραλάμπους, Εκδ. Π. ΖΗΤΗ & Σια Ο.Ε., Θεσσαλονίκη 1985

- Related academic journals:
  1. International Journal of Radiation Biology
  2. Radiation Biology
  3. Molecular Radiobiology