Course Specifications
Valid as from the academic year 2016-2017

Technology of Radiotherapy (E038110)

Course

<table>
<thead>
<tr>
<th>Course size (nominal values; actual values may depend on programme)</th>
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<tbody>
<tr>
<td>Credits 3.0</td>
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</tbody>
</table>

Course offerings and teaching methods in academic year 2016-2017

<table>
<thead>
<tr>
<th>A (semester 1)</th>
<th>microteaching</th>
<th>0.0 h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lecture</td>
<td>22.5 h</td>
</tr>
<tr>
<td></td>
<td>demonstration</td>
<td>5.0 h</td>
</tr>
<tr>
<td></td>
<td>self-reliant study activities</td>
<td>5.0 h</td>
</tr>
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Lecturers in academic year 2016-2017

De Wagter, Carlos
GE17 lecturer-in-charge

Offered in the following programmes in 2016-2017

| Master of Science in Biomedical Engineering | 3 | A |
| International Master of Science in Biomedical Engineering | 3 | A |
| Master of Science in Biomedical Engineering | 3 | A |

Teaching languages

English

Keywords

treatment simulator, medical linear accelerator, beam monitoring, collimation, multileaf collimator, electron beam, photon beam, brachytherapy, intensity modulated radiation therapy (IMRT), quality assurance

Position of the course

The student will gain knowledge and thorough understanding of the technology and its developments in radiotherapy. The focus is on the relation with the dosimetric capabilities and accuracy achievements.

Contents

- The treatment room - Introductory aspects of radiation oncology
- Treatment simulator, x-ray tube, imaging chain
- Basics of electromagnetism, acceleration and bending of electron beams, microwave components
- Technology of medical linear accelerators as source of photon and electron beams, travelling and standing wave acceleration, beam monitor, servo mechanisms, vacuum systems, internal shielding
- Beam modifiers, shaping of radiation beams, asymmetric fields, multileaf collimator, computer control
- Collimation technology specific to stereotactic radiotherapy
- Technology of Intensity modulated radiation therapy (IMRT)
- Technological methods to deal with organ motion
- Technology of advanced radiotherapy methods
- Brachytherapy and remote afterloading technology
- Machine quality assurance of the treatment delivery chain
- Selected topics: e.g. are the promising developments in radiotherapy technology driven?

Initial competences

Physics, electronics and mathematics (engineering bachelor level).

Final competences

(Approved)
1. Understand how the technological components and processes in radiotherapy equipment establish the dosimetric quality of the treatment.
2. Thoroughly understand how the linear accelerator works as a high-tech device.

**Conditions for credit contract**
Access to this course unit via a credit contract is determined after successful competences assessment.

**Conditions for exam contract**
This course unit cannot be taken via an exam contract.

**Teaching methods**
Demonstration, lecture, microteaching, self-reliant study activities.

**Learning materials and price**
Extensive syllabus and scientific papers available from Minerva website (in English).

**References**

**Course content-related study coaching**

**Evaluation methods**
End-of-term evaluation and continuous assessment.

**Examination methods in case of periodic evaluation during the first examination period**
Open book examination, oral examination.

**Examination methods in case of periodic evaluation during the second examination period**
Open book examination, oral examination.

**Examination methods in case of permanent evaluation**
Participation, report.

**Possibilities of retake in case of permanent evaluation**
Examination during the second examination period is possible.

**Extra information on the examination methods**
During examination period: written preparation. During semester: 2 reports.

**Calculation of the examination mark**
During examination period / Throughout semester = 80%/20%.