

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |                                         |                                     |                        |            |     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------|-------------------------------------|------------------------|------------|-----|
| Subject name and code                       | Dosimetry in Radionuclide Therapy, PG_00210215                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                         |                                     |                        |            |     |
| Field of study                              | Medical Physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |                                         |                                     |                        |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                          | Academic year of realisation of subject |                                     | 2026/2027              |            |     |
| Education level                             | Master's studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          | Subject group                           |                                     | Optional subject group |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | Mode of delivery                        |                                     | at the university      |            |     |
| Year of study                               | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | Language of instruction                 |                                     | Polish                 |            |     |
| Semester of study                           | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                          | ECTS credits                            |                                     | 3.0                    |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          | Assessment form                         |                                     | credit                 |            |     |
| Conducting unit                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                          |                                         |                                     |                        |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          | dr hab. Anna Synak                      |                                     |                        |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          |                                         |                                     |                        |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lecture                                                  | Tutorial                                | Laboratory                          | Project                | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30.0                                                     | 15.0                                    | 0.0                                 | 0.0                    | 0.0        | 45  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                         |                                     |                        |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Participation in didactic classes included in study plan |                                         | Participation in consultation hours |                        | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 45                                                       |                                         | 0.0                                 |                        | 30.0       | 75  |
| Subject objectives                          | The aim of the course is to introduce students to the fundamentals of radionuclide therapy and dosimetry, including their historical development, the current state of knowledge and legal regulations, imaging methods, as well as the models and computational tools used for dosimetric calculations. Students will gain knowledge of the limitations of contemporary dosimetry methods and the future perspectives of radionuclide therapy, enabling them to understand the role of the medical physicist in treatment planning and optimization. |                                                          |                                         |                                     |                        |            |     |

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| Learning outcomes               | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                       | Subject outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Method of verification                  |
|                                 | [FIZMEDMU2_W06] Knows and understands the current directions of development of physics and medical sciences, especially in the field of medical physics, and the fundamental dilemmas of modern civilisation.                                                                                                                                                                                                                                        | The student knows and understands the current trends in the development of radionuclide therapy and dosimetry, including advances in imaging techniques, dosimetric models, and computational tools, as well as the challenges associated with implementing personalized dosimetry and radionuclide therapy in clinical practice.                                                                                                                                                                                                                   | [SW2] presentation/project/paper/report |
|                                 | [FIZMEDMU2_U02] Can plan and conduct an experiment using new or adapt existing methods and tools, and critically analyse the results of measurements, observations or numerical calculations, assessing the accuracy of the results using known methods and tools.                                                                                                                                                                                   | The student is able to perform dosimetric calculations using imaging data, appropriate models, and dedicated software, critically analyse the obtained results, evaluate the impact of the applied models, input parameters, and data uncertainties on the accuracy of the calculations, and identify the limitations of the methods and tools used.                                                                                                                                                                                                | [SU2] presentation/project/paper/report |
|                                 | [FIZMEDMU2_U06] Can effectively communicate on specialised topics in the field of physics and medical physics with diverse audiences (specialists and non-specialists), skillfully justifying his/her position.                                                                                                                                                                                                                                      | The student is able to communicate specialist topics in radionuclide therapy and dosimetry using appropriate scientific terminology, discuss the historical development, current methodologies, imaging techniques, computational models, and software tools employed in dosimetric calculations, critically evaluate the limitations of current approaches, justify the choice of dosimetric methods, and present future directions in radionuclide therapy and dosimetry while adapting communication to specialist and non-specialist audiences. | [SU2] presentation/project/paper/report |
|                                 | [FIZMEDMU2_W04] Knows and understands in depth the theoretical foundations and principles of operation of measurement systems and research, diagnostic and therapeutic equipment specific to the field of physics and medicine.                                                                                                                                                                                                                      | The student knows and understands the theoretical foundations and operating principles of the equipment used in radionuclide therapy and medical imaging for dosimetric applications, as well as the computational models and software tools employed for dose calculation, treatment planning, and optimization.                                                                                                                                                                                                                                   | [SW2] presentation/project/paper/report |
|                                 | [FIZMEDMU2_W01] Knows and understands in depth selected issues in the field of physics and medicine, the complex relationships between them, and development trends in the exact and natural sciences, health sciences, and others.                                                                                                                                                                                                                  | The student knows and understands the physical and medical foundations of radionuclide therapy and dosimetry, the complex relationships between physical processes, medical imaging, and treatment planning, as well as current trends in the development of dosimetric methods and personalized radionuclide therapy.                                                                                                                                                                                                                              | [SW2] presentation/project/paper/report |
| Subject contents                | <ol style="list-style-type: none"> <li>History of Radionuclide Therapy</li> <li>Current State of Radionuclide Therapy and Dosimetry (Legal and Practical Perspectives)</li> <li>Concepts of Radionuclide Dosimetry</li> <li>Imaging for Dosimetric Calculations</li> <li>Models Used in Dosimetry</li> <li>Dosimetry Software</li> <li>Limitations of Current Methods</li> <li>Future Perspectives for Radionuclide Therapy and Dosimetry</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| Prerequisites and co-requisites | none                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |
| Assessment methods and criteria | Subject passing criteria                                                                                                                                                                                                                                                                                                                                                                                                                             | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Percentage of the final grade           |
|                                 | presentation                                                                                                                                                                                                                                                                                                                                                                                                                                         | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 100.0%                                  |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                                                                                                                                                                                                     | own materials                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |

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|----------------------------------------------------------------|--------------------------|---------------|
|                                                                | Supplementary literature | own materials |
|                                                                | eResources addresses     |               |
| Example issues/<br>example questions/<br>tasks being completed |                          |               |
| Work placement                                                 | Not applicable           |               |

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