GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Planning of radiation therapy, PG_00053352 | | |
| Field of study | Biomedical Engineering, Biomedical Engineering, Biomedical Engineering | | |
| Date of commencement of studies | February 2027 | Academic year of realisation of subject | 2027/2028 |
| Education level | second-cycle studies | Subject group | Optional subject group<br>Specialty subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 3 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Brygida Mielewska | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 30 |

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 | 30 | 2.0 | 18.0 | 50 |

**Subject objectives**

The aim of the course is to present the current methods and tools for treatment planning in radiotherapy with the use of photos, electrons as well as with ions and neutrons

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study | Student is able to discuss the structure of a medical accelerator and the role of individual elements of radiation systems | [SW1] Assessment of factual knowledge |
| [K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment | Student works with the codes of practise and protocols in radiotherapy | [SU4] Assessment of ability to use methods and tools |
| [K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions | Student is able to perform typical measurements of accelerator characteristics and activities related to the exposure planning process | [SU1] Assessment of task fulfilment |

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| Subject contents | Course content – lecture<br>1. Interaction of ionizing radiation with matter<br>2. Fundamentals of radiotherapy<br>3. Target definition in treatment planning<br>4. Beam DefinitionVirtual Simulation<br>5. Photon-Beam Treatment Planning Techniques<br>6. Electron-Beam Treatment Planning Techniques<br>7. Dose Evaluation of Treatment Plans<br>8.Biological Evaluation of Treatment Plans<br>9. Quality Assurance of the Treatment Planning Process<br>10. Quality Control of Treatment Delivery |
| Prerequisites and co-requisites | Nuclear medicine and radiotherapy - fundamentals |

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| written report | 50.0% | 50.0% |
| written exams/test | 50.0% | 50.0% |

**Recommended reading**

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| Basic literature | Handbook of radiotherapy Physics, ed. P. Mayles, wyd Taylor&Francis |
| Supplementary literature | Praca zbiorowa pod redakcją A. Z. Hrynkiewicza i E. Rokity<br>"Fizyczne metody diagnostyki medycznej i terapii"<br>G. J. Kutcher, C. Burman<br>"Calculation of complication probability factors for non-uniform normal tissue irradiation; the effective volume method"<br>Int. J. Radiat. Oncol. Biol. Phys., 16, 1623-1630, 1989 |
| eResources addresses | |

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|---|---|
| Example issues/ example questions/ tasks being completed | 1. Probability of healing<br>2. Probability of damage of normal tissue |
| Practical activites within the subject | Not applicable |

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