Since 2014/2015

# MEDICAL PHYSICS
## Undergraduate Study Programme

| No | Course Title | | Exam after semester | Total | type of classes | | | I YEAR | | | | | | | | II YEAR | | | | | | | | III YEAR | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1 sem | | | | 2 sem | | | | 3 sem. | | | | 4 sem | | | | 5 sem | | | | 6 sem | | | |
| | | | | | lect. | tut | lab. | lect | tut | lab | ECTS | lect | tut | lab | ECTS | lect | tut | lab | ECTS | lect | tut | lab | ECTS | lect | tut | lab | ECTS | lect | tut | lab | ECTS |
| 1 | *Introduction to Physics with Elements of Higher Mathematics* | | | 60 | 15 | 45 | | 1 | 3 | | 6 | | | | | | | | | | | | | | | | | | | | |
| 2 | *Mathematical Analysis (I + II)* | | 1,2 | 165 | 60 | 105 | | 2 | 4 | | 8 | 2 | 3 | | 6 | | | | | | | | | | | | | | | | |
| 3 | *Linear Algebra* | | 2 | 60 | 30 | 30 | | | | | | 2 | 2 | | 5 | | | | | | | | | | | | | | | | |
| 4 | *Mathematical Methods of Medical Physics *)* | | 3 | 60 | 30 | 30 | | | | | | | | | | 2 | 2 | | 5 | | | | | | | | | | | | |
| 5 | *Computational Methods of Medical Physics *)* | | | 60 | 30 | | 30 | | | | | | | | | 2 | | 2 | 6 | | | | | | | | | | | | |
| 6 | *Elements of Statistics* | | | 30 | | | 30 | | | | | | | | | | | | | | | 2 | 2 | | | | | | | | |
| 7 | *Information Technology* | | | 30 | | | 30 | | | 2 | 4 | | | | | | | | | | | | | | | | | | | | |
| 8 | *Introduction to Programming* | | | 30 | | | 30 | | | | | | | 2 | 2 | | | | | | | | | | | | | | | | |
| 9 | *Laboratory of Medical Signals *)* | | | 30 | | | 30 | | | | | | | | | | | | | | | 2 | 2 | | | | | | | | |
| 10 | *Electrophysiological Laboratory *)* | | | 15 | | | 15 | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Principles of Physics for Medical Physics I | | 1 | 90 | 45 | 45 | | 3 | 3 | | 8 | | | | | | | | | | | | | | | | | | | | |
| 12 | Principles of Physics for Medical Physics II | | 2 | 75 | 45 | 30 | | | | | | 3 | 2 | | 5 | | | | | | | | | | | | | | | | |
| 13 | Physical Laboratory 1 (Mechanics and Thermodynamics) *) | | | 45 | | | 45 | | | | | | | 3 | 3 | | | | | | | | | | | | | | | | |
| 14 | Principles of Physics for Medical Physics III *) | | 3 | 60 | 30 | 30 | | | | | | | | | | 2 | 2 | | 5 | | | | | | | | | | | | |
| 15 | Physical Laboratory 1 (Elektromagnetism and Spektroscopy) *) | | | 45 | | | 45 | | | | | | | | | | | 3 | 4 | | | | | | | | | | | | |
| 16 | Principles of Modern Physics - Quantum Physics *) | | 4 | 60 | 30 | 30 | | | | | | | | | | | | | | 2 | 2 | | 5 | | | | | | | | |
| 17 | Physical Laboratory 2 for Quantum Physics and Biophysics *) | | | 60 | | | 60 | | | | | | | | | | | | | | | 4 | 4 | | | | | | | | |
| 18 | Physics of Ionising Radiation *) | | 5 | 90 | 30 | 15 | 45 | | | | | | | | | | | | | | | | | 2 | 1 | 3 | 8 | | | | |
| 19 | *Fundamentals of Theoretical Physics for Medical Physics I* | | 4 | 60 | 30 | 30 | | | | | | | | | | | | | | 2 | 2 | | 4 | | | | | | | | |
| 20 | *Fundamentals of Theoretical Physics for Medical Physics II* | | | 60 | 30 | 30 | | | | | | | | | | | | | | | | | | 2 | 2 | | 5 | | | | |
| 21 | Medical Chemistry | | 2 | 30 | 30 | | | | | | | 2 | | | 3 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Psychology with Elements of Clinical Psychology | | | 30 | 30 | | | | | | | 2 | | | 2 | | | | | | | | | | | | | | | | |
| 23 | The logic with Elements of Semiotics | | | 15 | 15 | | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | |
| 24 | Ethics | | | 15 | 15 | | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | |
| 25 | English | | 2 | 120 | | 120 | | | 4 | | 2 | | 4 | | 3 | | | | | | | | | | | | | | | | |
| 26 | Physical Education | | | 30 | | 30 | | | | | | | 2 | | 1 | | | | | | | | | | | | | | | | |
| 27 | Protection of Intellectual Property and Copyright Law | | | 15 | | 15 | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Correct Anatomy | | 3 | 35 | 20 | | 15 | | | | | | | | | 1,3 | | 1 | 4 | | | | | | | | | | | | |
| 29 | Physiology | | 3 | 20 | 20 | | | | | | | | | | | 1,3 | | | 3 | | | | | | | | | | | | |
| 30 | Fundamentals of Clinical Medicine and its Diagnostic Imaging | | 4 | 45 | 30 | 15 | | | | | | | | | | | | | | 2 | 1 | | 4 | | | | | | | | |
| 31 | *Biothermodynamics with Elements of the Statistical Physics* | | 5 | 60 | 30 | 30 | | | | | | | | | | | | | | | | | | 2 | 2 | | 4 | | | | |
| 32 | Biophysics of Biological Systems | | 4 | 30 | 30 | | | | | | | | | | | | | | | 2 | | | 2 | | | | | | | | |
| 33 | Medical Apparatus | | 6 | 60 | 30 | | 30 | | | | | | | | | | | | | | | | | | | | | 2 | | 2 | 5 |
| 34 | Fundamentals of Radiology and Quality Control in Radiology | | 5 | 60 | 30 | | 30 | | | | | | | | | | | | | | | | | 2 | | 2 | 5 | | | | |
| 35 | Fundamentals of Radiotherapy and Quality Control in Radiotherapy | | 6 | 60 | 30 | | 30 | | | | | | | | | | | | | | | | | | | | | 2 | | 2 | 5 |
| 36 | Fundamentals of Nuclear Medicine and Quality Control in Nuclear Medicine | | 6 | 30 | 15 | | 15 | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | 3 |
| 37 | Radiobiology, Dosimetry, Radiological Protection | | 5 | 60 | 30 | 30 | | | | | | | | | | | | | | | | | | 2 | 2 | | 5 | | | | |
| 38 | Basics of Economics and Management in Health Care | | | 15 | 15 | | | | | | | | | | | 1 | | | 1 | | | | | | | | | | | | |
| 39 | Medical Law in Radiological Protection | | | 10 | 10 | | | | | | | | | | | 0,7 | | | 1 | | | | | | | | | | | | |
| 40 | Fundamentals of Research Methodology | | | 10 | 10 | | | | | | | | | | | 0,7 | | | 1 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Optional lectures (totally 90 hours of lectures and 15 hours of tutorials) *) | | | | 105 | 90 | | 15 | | | | | | | | | | | | | | | | | 3 | | | 3 | 3 | | 1 | 5 |
| 41 | Medical Physics in Neurology | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | Medical Physics in Cardiology | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43 | The History of Medicine with History of Radiology | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | Radiological Informatics | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | English Radiological Terminology | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | English IT Terminology | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | Positron Emission Tomography | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | Ultrasonography | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49 | Spectroscopy of Biological Systems | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | *Chaos Theory and its Applications in Medicine* | | | | 15 | | 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | *3D Modelling of Biological Systems* | | | | 15 | | 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52 | *Foundation Course to Practice in Health Care System Units* | | | 20 | 20 | | | | | | | | | | | | | | | 1,3 | | | 1 | | | | | | | | |
| 53 | *Practice, 4 week* | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | |
| 54 | *Bachelor's Seminar *)* | | | | | 30 | | | | | | | | | | | | | | | | | | | | | | 2 | | | 2 |
| 55 | Preparation of Diploma Work and to Bachelor's exam *) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Total hours | | 2060 | 885 | 690 | 495 | 8 | 14 | 2 | 30 | 11 | 13 | 5 | 30 | 11,0 | 4 | 6 | 30 | 10 | 5 | 9 | 30 | 13 | 7 | 5 | 30 | 8 | 2 | 6 | 30 |
| | | Total exams | | 22 | hours per week | | | 24 | | | | 29 | | | | 21,0 | | | | 24,3 | | | | 25 | | | | 16 | | | |
| | | | | | hours per semester | | | 360 | | | | 435 | | | | 315 | | | | 364,5 | | | | 375 | | | | 240 | | | |
| | | | | | exams/assessments per semester | | | 2 | 6 | | | 5 | 4 | | | 4 | 5 | | | 4 | 4 | | | 4 | 3 | | | 3 | 2 | | |
| | | | | | | | | ex | ass | | | ex | ass | | | ex | ass | | | ex | ass | | | ex | ass | | | ex | ass | | |

credits are awarded based on continous assessment and final exam

credits are awarded based on continous assessment

*) courses with options

Labour safety/ergonomy, 4 hours

Total ECTS points: **180**