**Course Title:** **Biophysical fundamentals of medical technologies**

**Coordinator /contact: Prof. Eugeniusz Rokita/e-mail:ufrokita@cyf-kr.edu.pl**

**Responsible person/contact: Prof. Eugeniusz Rokita (seminar)/email: ufrokita@cyf-kr.edu.pl, Dr hab. G. Tatoń (laboratory)/e-mail:** [**mmtaton@cyf-kr.edu.pl**](mailto:mmtaton@cyf-kr.edu.pl)

**Address: Department of Biophysics, Św. Łazarza 16**

**Year: 2**

**Total number of hours: 50**

**Lectures: -**

**Seminars: 20**

**Labs/Practicals: 28**

**Others (e.g. recitation): -**

**Exams: 2**

**Conduct/Dress Code:**

**Student’s Evaluation:**

**-credit requirements: Seminar/Laboratory credits – see remarks**

**-attendance requirements: Seminar 1 + Laboratory 1**

**-type of the final exam: Test exam**

**-retake information: May/June, 2018**

|  | **Day** | **Time** | **Type**  **of classes** | **N0 of hours** | **Group** | **Topic** | **teacher** | **place** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **week 16**  **February 19 - 23** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Biophysical description of biological systems** | **ER** | **S2** |
| **Tu** | **1500 – 1630** | **lab** | **2** | **A** | **Digital processing of data and images** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Biophysical description of biological systems** | **ER** | **S2** |
| **We** | **1445 – 1615** | **lab** | **2** | **B** | **Digital processing of data and images** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Biophysical description of biological systems** | **ER** | **S2** |
| **Th** | **1430 – 1600** | **lab** | **2** | **C** | **Digital processing of data and images** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Biophysical description of biological systems** | **ER** | **S2** |
| **Fr** | **1430 – 1600** | **lab** | **2** | **D** | **Digital processing of data and images** | **DD/GT** | **201** |
| **week 17**  **February 26 - March 02** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Structure of matter and conservation laws** | **ER** | **S2** |
| **Tu** | **1500 – 1630** | **lab** | **2** | **A** | **Data acquisition and evaluation** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Structure of matter and conservation laws** | **ER** | **S2** |
| **We** | **1445 – 1615** | **lab** | **2** | **B** | **Data acquisition and evaluation** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Structure of matter and conservation laws** | **ER** | **S2** |
| **Th** | **1430 – 1600** | **lab** | **2** | **C** | **Data acquisition and evaluation** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Structure of matter and conservation laws** | **ER** | **S2** |
| **Fr** | **1430 – 1600** | **lab** | **2** | **D** | **Data acquisition and evaluation** | **DD/GT** | **201** |
| **week 18**  **March**  **05 - 09** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Introduction to transport** **phenomena** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Introduction to transport** **phenomena** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Introduction to transport** **phenomena** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Introduction to transport** **phenomena** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 19**  **March**  **12 - 16** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Biophysical background of electrophysiology** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Biophysical background of electrophysiology** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Biophysical background of electrophysiology** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Biophysical background of electrophysiology** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 20**  **March**  **19 - 23** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Biophysics of senses** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Biophysics of senses** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Biophysics of senses** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Biophysics of senses** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 21**  **March 26**  **- April 06** |  |  |  |  |  |  |  |  |
|  |  |  |  |  | **Day off** |  |  |
|  |  |  |  |  |  |  |  |
| **week 22**  **April**  **09 - 13** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Interaction of EM radiation with biological systems** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Interaction of EM radiation with biological systems** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Interaction of EM radiation with biological systems** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Interaction of EM radiation with biological systems** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 23**  **April**  **16 - 20** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Medical application of radioisotopes/radiotherapy** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Medical application of radioisotopes/radiotherapy** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Medical application of radioisotopes/radiotherapy** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Medical application of radioisotopes/radiotherapy** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 24**  **April**  **23 - 27** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Radiology** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Radiology** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Radiology** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Radiology** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 25**  **April**  **30 – May 04** |  |  |  |  |  |  |  |  |
|  |  |  |  |  | **Day off** |  |  |
|  |  |  |  |  |  |  |  |
| **week 26**  **May**  **07 - 11** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **CT and MRI** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **CT and MRI** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **CT and MRI** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **CT and MRI** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |
| **week 27**  **May**  **14 - 18** | **Tu** | **1500 – 1630** | **sem** | **2** | **B** | **Ultrasonography** | **ER** | **S2** |
| **Tu** | **1500 – 1715** | **lab** | **3** | **A** | **LAB 3-10** | **BL/TR** | **201** |
| **We** | **1445 – 1615** | **sem** | **2** | **A** | **Ultrasonography** | **ER** | **S2** |
| **We** | **1445 – 1700** | **lab** | **3** | **B** | **LAB 3-10** | **BL/DD** | **201** |
| **Th** | **1430 – 1600** | **sem** | **2** | **D** | **Ultrasonography** | **ER** | **S2** |
| **Th** | **1430 – 1645** | **lab** | **3** | **C** | **LAB 3-10** | **GT/MS** | **201** |
| **Fr** | **1445 – 1615** | **sem** | **2** | **C** | **Ultrasonography** | **ER** | **S2** |
| **Fr** | **1430 – 1645** | **lab** | **3** | **D** | **LAB 3-10** | **DD/GT** | **201** |

**Abbreviations:**

**ER – Prof. Eugeniusz Rokita**

**GT – Grzegorz Tatoń, PhD**

**BL – Bartosz Lisowski, MSc**

**TR - Tomasz Rok, PhD**

**DD – Daniel Dziob, MSc**

**MS – Michał Świątek, MSc**

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**Remarks:**

**SEMINARS - 1÷10 → week 16÷27**

**At the end of each seminar student has to solve 4÷5 problems directly correlated with the topic of the seminar. The solution of problems will be evaluated using (0÷10) point scale.**

**LAB - 1÷2 → week 16÷17**

**First and second meetings are treated as an introduction to the laboratory. Students will be split into 2-person teams and will complete one exercise (Data acquisition and evaluation) for training. Moreover, detailed schedule of the laboratory (Lab 3÷10) for each team will be announced during 2nd laboratory.**

**LAB - 3÷10 → week 18÷27**

**Each team has to complete 8 exercises from the list given below (1 per week).**

| **LAB** | **Description** |
| --- | --- |
| **3.** | **Ultrasonic imaging.** |
| **4.** | **Principles of magneto-therapy.** |
| **5.** | **Electrocardiography.** |
| **6.** | **Applanation tonometry** |
| **7.** | **Digital subtraction angiography.** |
| **8.** | **Strength of bone.** |
| **9.** | **Model of the respiratory system.** |
| **10.** | **Model of the cardiovascular system.** |
| **11.** | **Haemodialysis, blood purification system.** |
| **12.** | **Electro-therapy.** |

**To pass each exercise student has to complete himself a simple experiment and has to prepare a report containing results, calculations, discussion of the results and final conclusions. The report will be evaluated using (0÷10) point scale.**

**Seminar/Laboratory credit → 60% of maximal number of points (60/48 - sem/lab)**