

### Course Curriculum: Medical Physics and Biophysics (2023/24)

Subject	Lecturer	Location	Literature
<b>Part 1: Physics of diagnostic imaging</b>			
L1/2: Introduction. Basics of nuclear physics	Raguž	Classroom #3	Web
L2/2: Radiation and matter	Raguž	Classroom #3	Web
L3/2: Physical basis of nuclear medicine	Raguž	Classroom #5	Web
S1/2: Recapitulation seminar I: L1 – L3	Raguž	Classroom #3	Web
L4/2: Physics of diagnostic radiology	Raguž	Classroom #3	Web
L5/1: Physics of MR imaging	Raguž	Classroom #3	Web
L6/1: Ultrasound physics	Raguž	Classroom #3	Web
S2/2: Recapitulation seminar II: L4 – L6	Raguž	Classroom #4	Web
S3/2: Comparison of diagnostic methods	Raguž	Classroom #4	Web
<b>Part 2: Biophysical basis of physiology</b>			
L7/2: Biotransports, membrane potential	Raguž	Classroom #3	Web
L8/2: Action potential	Raguž	Classroom #4	Web
S4/2: Potentials on the surface of the body	Raguž	Classroom #4	Web
S5/2: Recapitulation seminar III: L7 – L8 and S4	Raguž	Classroom #3	Web
L9/2: Biophysics of senses, ear and hearing	Raguž	Physiological practicum	Web
L10/2: Biophysics of eye and sight	Raguž	Physiological practicum	Web
S6/2: Recapitulation seminar IV: L9 – L10	Raguž	Classroom #3	Web
L11/1: Biomechanics of tissues	Raguž	Classroom #3	Web
L12/1: Body biomechanics	Raguž	Classroom #3	Web
S7/2: Recapitulation seminar V: L11 – L12	Raguž	Classroom #3	Web
L13/2: Hemorheology I	Raguž	Classroom #3	Web
L14/2: Hemorheology II	Raguž	Classroom #3	Web
S8/2: Recapitulation seminar VI: L13 – L14	Raguž	Classroom #3	Web
E1/2: Introduction to cyclic exercises. Overview. Statistics.	Galić	Physiological practicum	Sumarum
E2/2: Radiotherapy	Galić	UHMO	Sumarum
E3/3: Radiology and nuclear medicine	Galić	UHMO	Sumarum
E4/2: Cyclic exercises C1 – C5	Lasić	Physiological practicum	Sumarum
E5/2: Cyclic exercises C1 – C5	Lasić	Physiological practicum	Sumarum
E6/2: Cyclic exercises C1 – C5	Lasić	Physiological practicum	Sumarum
E7/2: Cyclic exercises C1 – C5	Lasić	Physiological practicum	Sumarum
E8/2: Cyclic exercises C1 – C5	Lasić	Physiological practicum	Sumarum
E9/2: Extra term for cyclic exercises	Lasić	Physiological practicum	Sumarum

E10/2: Practical exam	Lasić	Physiological practicum	Sumarum
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Total classes: 24 L + 16 S + 20 E

L=lecture; S=seminar; E=exercise;

### **Cyclic exercises:**

C1: Microscopy

C2: Periodic Signal Analysis

C3: Electric Circuit

C4: Viscosity

C5: Surface Tension

### **Locations:**

Classrooms and Physiological practicum, School of Medicine, University of Mostar

University Hospital Mostar - UHMO

### **Literature:**

Materials accessible at the following web site cover the great majority of subjects

<http://www.mefst.unist.hr/education/courses/biophysics/1488>

Additional literature: 1. JA Pope: Medical Physics (second edition); Heinemann, 1989.

### **Students' obligations**

Students have to attend all course lectures, seminars and exercises. Up to 20% of **justified** absence from seminars and lectures can be tolerated.

Students are expected to participate actively during the course.

### **Types of seminars**

*First type* is described in the course curriculum by a name of the topic to be covered. The names in the curriculum correspond to the chapter titles in the literature. Seminars are interactive. The teacher explains the topic at hand and can pose questions to the students in order to assess their current knowledge. Students are expected to prepare the content of corresponding seminars in advance.

*Second type* of seminar is a recapitulation seminar. The goal of this type of seminar is to address the most common issues regarding the topics covered during few previous lectures and seminars. The

student's positive response at recapitulation seminar will be awarded with a bonus point. Only one bonus point per seminar can be obtained by one student. Number of possible bonus points at seminars is 6.

### **Types of exercises**

*Introduction exercise term (E1)* includes explanation of mathematical functions and statistical methods required to analyze data collected during cyclic exercises.

*First exercise type - cyclic exercises (C1-C5)* include five different laboratory exercises. Students are expected to prepare the content of corresponding exercise in advance. The teaching material will be posted in Sumarum. At the beginning of exercises the teacher will check whether the students are ready to perform the exercise through a short conversation. During exercise the students will make measurements. They are supposed to analyze data at home and present their reports during next exercise term. The teacher will review the results and make comments if mistakes were made during collecting data or calculation. If student does not bring or present unsatisfactory report he/she will be obligated to repeat that exercise during additional exercise term that will be organized at the end of classes (E9). Student can repeat exercise only once. If a student doesn't appear for any of exercises he/she will have to take an additional exercise term. All students who miss one exercise term will be obliged to take it.

*Second exercise type* will be organized in the hospital (E2 and E3). The goal is to familiarize students with the physical methods and instrumentation used in the hospital in order to obtain detailed diagnostic information and achieve useful therapeutic effects.

After completing all the exercises, students are obligated to take practical exam (E10) related to the exercises. Students will be awarded with a bonus point during practical exam. Number of minimal bonus points that student should obtain during practical exam in order to qualify to take written exam is 2. Maximal number of bonus points that student can achieve during practical exam is 5.

Number of total bonus points awarded during seminars and exercises will be added to the written exam score if a student passes the threshold for the written exam (33 points). Bonus points are valid only for the first exam term.

Attending all exercises is mandatory. Students are strongly advised to participate actively during the course.

**Exam:**

Practical exam will be related to exercises during course. After that students have to pass the written exam (in form of a test, comprised of 60 questions, each containing 5 statements: 4 false and 1 true). The threshold for the written exam is 33 points.

Criteria for passing grades:

33 – 39 sufficient (2)

40 – 46 good (3)

47 – 53 very good (4)

54 – 60 excellent (5)

1st exam term – January 8, 2024

2nd exam term – February 26, 2024