



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physiology and kinesiology [S1IBio1>FzK]

### Course

Field of study

Biomedical Engineering

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

15

### Number of credit points

2,00

### Coordinators

dr inż. Jakub Grabski  
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### Lecturers

### Prerequisites

- Basic in the field of human physiology with elements of kinesiology. - Acquiring new interdisciplinary theoretical and practical knowledge in biological and medical sciences in the aspect of using it in technical sciences. - Logical thinking, the use of information obtained from the library, the Internet, lectures and seminars.

### Course objective

Understanding the physiological mechanisms occurring in the human body. Mapping phenomena occurring in nature with the possibilities of using them in technical sciences. Imitation of physiological processes with the possibilities of the current technique.

### Course-related learning outcomes

Knowledge:

1. Student should define and recognize physiological phenomena in humans.
2. Student it should explain the physiological and mechanical characteristics of human motion.
3. Student should describe the processes of controlling human movements through the central nervous system and neurophysiological mechanisms of motion control.

#### Skills:

1. Student can use basic physiological phenomena in biomedical engineering.
2. Student can characterize the physiological phenomena of human motion that can be used in biomedical engineering.
3. Student can, according to the given specification, design and make a simple device, object, system or process typical for observing physiological phenomena.

#### Social competences:

1. Student is able to interact and work in a group.
2. Student is able to set priorities for the implementation of a task set by himself or others.
3. Student is aware of the role of physiological phenomena in modern medicine and technology.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Forming rating:

Based on answers to questions concerning the material discussed in previous lectures

Lecture: Pass on the basis of a test consisting of 5 general questions (pass in the case of a correct answer to at least 3 questions: <3 Ndst, 3? Dst, 3,5 Dst +, 4 Db, 4,5 Db +, 5 vb) carried out at the end of the semester.

Seminar: Assessment based on an oral or written answer regarding the content of each seminar. To get all of the seminars to pass, you should get a positive evaluation of the answers from each of them.

### Programme content

Human physiology and kinesiology with focused on the various systems.

### Course topics

1. Introduction to human physiology with regard to historical features.
2. Respiratory physiology.
3. Physiology of the digestive system.
4. Physiology of the circulatory system.
5. Physiology of the endocrine system.
6. The genitourinary system's function.
7. The function of the central and peripheral nervous system. Neuromuscular coordination.
8. Physiology and functions of the musculoskeletal system. Biostructure of muscle and muscle fiber.
9. Kinesiology? description of kinetics and kinematics in individual human joints.
10. Man's gait mechanism, cycles and gait phases. Muscle activity during walking.
11. Muscle mechanism in anaerobic conditions (muscle fatigue).
12. Types of muscle contraction (isometric, isotonic and isokinetic).
13. Neurophysiological studies: electromyography, electroneurography, and evoked potentials.
14. Hand functions in various activities of everyday life.

### Teaching methods

1. Lecture: multimedia presentation.
2. Laboratory exercises: performing exercises, discussion, team work.

### Bibliography

#### Basic:

1. Zdzisław Adach. Ćwiczenia z fizjologii ogólnej i fizjologii wysiłku fizycznego. AWF Poznań 2010
2. William Ganong. Fizjologia. PZWL 2009
3. Władysław Traczyk. Fizjologia człowieka w zarysie. Wydawnictwo Lekarskie PZWL, 2005
4. Joseph Muscolino Kinesiology: The Skeletal System and Muscle Function, 2e Mosby 2010

#### Additional:

1. I.A. Kapandji. The Physiology of the Joints. Churchill Livingstone 2008.
2. Ryszard Kinałski. Neurofizjologia kliniczna dla neuror rehabilitacji. Podręcznik dla studentów i

absolwentów wydziałów fizjoterapii. MedPharm, Wrocław 2008, wyd.1.

3. Ludmiła Borodulin-Nadzieja. Fizjologia człowieka - podręcznik dla studentów. Górnicki Wydawnictwo Medyczne Wrocław 2005, wyd.1.

### Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 50    | 2,00 |
| Classes requiring direct contact with the teacher   | 30    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 20    | 1,00 |