



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Drives of medical and rehabilitation devices [S1IBio1E>NUMiR]

### Course

Field of study

Biomedical Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

English

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. Michał Zielinski

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### Lecturers

### Prerequisites

Basic knowledge of machine construction, basics of machine construction, electrical engineering and automation. The ability to think logically, use information obtained from the library and the Internet. Understanding the need for learning and acquiring new knowledge.

### Course objective

Understanding the construction, elements and principles of selection of drives for medical devices

### Course-related learning outcomes

Knowledge:

The student should be able to characterize the basic types of medical device drives. The student should know the basic methods of selecting medical device drive components.

Skills:

Student is able to determine the requirements of drives for a given medical device. The student is able to independently design the medical device drive scheme. The student is able to choose the components of the medical device drive.

Social competences:

Student is able to cooperate in a group. The student is aware of the possibilities of modern medical device drives. The student is able to use the catalog data of the manufacturers of drive components for medical devices.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit based on a test consisting of five general questions. Credit in the case of a correct answer to min. 3 questions.

Project: Credit based on the assessment for the implementation of the individual design of the drive selection for the indicated medical device

### Programme content

Lecture:

1. Requirements for drives used in medical devices, especially regarding sterility.
2. Characteristics of drives used in medical devices, pneumatic, electric and electro-mechanical.
3. Medium power drives for driving rehabilitation devices.
4. Low power drives and micro drives.
5. Drives for vibrating and dosing devices.
6. Kinematic drives and robots and operational manipulators.
7. Calculations and selection of drives due to loads.
8. Supply and control of medical device drives.
9. Maintenance and periodic inspections of drives.

Project:

Individual design of medical device driven (e.g. rehabilitation device, medical manipulator, dispensing device)

### Course topics

none

### Teaching methods

Lecture illustrated by multimedia presentations

### Bibliography

Basic:

1. Szenajch W. Napęd i sterowanie pneumatyczne. WNT
2. Kamiński G. Silniki elektryczne z toczącymi się wirnikami, PW
3. Materiały dydaktyczne PP dotyczące budowy i rodzaju napędów

Additional:

1. Kosmol. J.: Serwonapędy obrabiarek sterowanych numerycznie, WNT Warszawa 2004

### 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