



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of components for medical devices [S1IBio1E>PPUM]

Course

Field of study

Biomedical Engineering

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

English

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

15

Number of credit points

2,00

Coordinators

dr inż. Stanisław Pabiszczak

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Lecturers

Prerequisites

A student starting this subject should have basic technical knowledge, be familiar with the principles of creating a technical drawing and selecting construction materials. He should be able to think logically, operate any CAD system and use information obtained from the library and the Internet.

Course objective

The aim of the course is to provide students with knowledge of the principles of designing components for medical devices.

Course-related learning outcomes

Knowledge:

1. The student should be able to characterize the general principles of designing medical devices and indicate specific requirements for such devices. 2. The student should be able to describe the design process of the element and the principles of selection of construction material for components and medical devices.

Skills:

1. The student should be able to determine the requirements and propose several possible variants of solving the given construction problem for a given medical device.
2. The student should be able to choose the construction material and shape of the designed element, taking into account available technology.
3. The student should be able to develop the construction documentation of the designed device.

Social competences:

1. Student is able to cooperate in a group.
2. The student is aware of the importance of medical devices for society in the modern world.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit based on a test consisting of 10 test questions and 3 descriptive questions. Credit in the event of obtaining at least 50% of the possible points.

Project: Credit based on the individual device design for medical application.

Programme content

Lecture: students learn the principles of design and construction of components and medical devices. The following issues will be discussed: basic requirements for the design and construction of medical devices, rules for placing medical devices on the market, putting into use and submitting for performance evaluation, rules for the selection of construction materials for medical devices, CE marking of a medical device, classification of medical devices, safety of medical equipment, design taking into account aspects of assembly, service and utilization.

Project: students develop structures based on the individual topics received. The design must include a review of the state of the art, construction variants and their assessment, necessary calculations, selection of materials, 3D model of the device, assembly drawing and assembly drawings of the indicated parts.

Course topics

none

Teaching methods

Lecture: presentation supplemented with sketches made on the board.

Project: consultation of individual progress in project work.

Bibliography

Basic:

1. Ustawa z dnia 20 maja 2010 roku o wyrobach medycznych (Dz.U. 2010 nr 107 poz. 679)
2. Dyrektywa Unijna 93/42/EWG
3. Metody twórczego rozwiązywania problemów inżynierskich, Branowski B., Wyd. WKT NOT, 1999
4. Podstawy Konstrukcji Maszyn (tom 2), pod red. Marka Dietrycha, PWN, Warszawa, 1999
5. Roboty medyczne, Budowa i zastosowanie, Podśędkowski Leszek, WNT 2010
6. Podstawy konstrukcji maszyn, Zbigniew Osiński, PWN 2012

Additional:

1. E. Lisowski, Modelowanie geometrii elementów maszyn i urządzeń w systemach CAD 3D, Wydawnictwo Politechniki Krakowskiej, Kraków 2003
2. Mechanical Design of Machine Elements and Machines, Collins J., John Wiley & Sons, 2003
3. Poradnik mechatronika, Haberle Gregor, Haberle Heinz, Kilgus Roland, REA 2010
4. Maszyny kroczące, Podstawy, projektowanie, sterowanie i wzorce biologiczne, Teresa Zielińska, PWN 2013
5. Teoria mechanizmów i manipulatorów, Podstawy i przykłady zastosowań w praktyce, Morecki Adam, Knapczyk Józef, WNT 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