COURSE DESCRIPTION CARD - SYLLABUS

Course name
Medical equipment [S1IBio1E>AM]

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
15

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

4,00

Coordinators

Lecturers

Prerequisites

Basic knowledge of physics, biophysics, mechanics, electronics and biology

Course objective

Knowledge of the construction, principles of operation and mode of exploitation of medical devices: diagnostic and therapeutic.

Course-related learning outcomes

Knowledge:
A student can characterize the basic diagnostic medical devices and selected therapeutic medical devices.
A student is able to:
characterize the methods of proper and safe use of medical equipment;
describe the sources of biological signals registered by medical devices.

Skills:
A student can make a critical analysis of a medical device operation.
A student is able to evaluate the existing technical solutions used in the medical device.
Student is able to design a simple device, medical facility, a system typical for biomedical engineering.

Social competences:
A student knows the essence of understanding the medical aspects of engineering activities, constant updating of his knowledge.
A student can collaborate with a medical staff.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Summative assessment:
Course final exam (written, 4 questions). The condition to receive a positive evaluation is to obtain at least 50% of the maximum number of points.
Laboratory: written/oral answer + lab reports; passing rules: Points are awarded for individual elements. The condition to receive a positive evaluation is to obtain at least 50% of the maximum number of points.
Project: positive assessment for a student project. The condition to receive a positive evaluation is to obtain at least 50% of the maximum number of points.

Programme content

Lectures scope:
1. General characteristics, current status and development trends of medical apparatus.
2. Devices for measuring selected properties of the circulatory system.
3. Electrocardiographs.
4. Stimulators and cardiostimulators.
5. Devices for testing the properties of the respiratory system.
6. Diagnostic equipment.
7. Rehabilitation devices.
8. Support devices for people with disabilities.
Lab scope:
1. Blood pressure noninvasive measurement.
2. Heart properties and cardiovascular measurements.
3. Blood vessels ultrasonography.
4. Internal organs ultrasonography.
5. Measurements of mechanical properties of the respiratory system.
6. Laser therapy.
Project: Project of a research-didactic system for biological / medical measurements of the human body properties.

Course topics

none

Teaching methods

Lectures: oral presentation with illustrated examples on a blackboard, calculations.
Laboratory: lab experiments, tasks solving, discussions.
Project: solving of practical problems, working in a group, discussions.

Bibliography

Basic:
1. M. Nałęcz (red.), Biocybernetyka i inżynieria biomedyczna 2000, tom 2, Biopomiary, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2001.
2. G. Pawlicki, T. Pałko, N. Golnik, B Gwiazdowska, L. Królicki, M. Nałęcz (red.), Biocybernetyka i inżynieria biomedyczna 2000, tom 9, Fizyka Medyczna, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2005.
3. D. Kucharski, L. Marciniak-Podsadna, E. Stachowska, Laboratorium aparatury medycznej, Wydawnictwo Politechniki Poznańskiej, Poznań, 2017.
4. Instrukcje obsługi urządzeń medycznych w laboratorium dydaktycznym.

Additional:
1. L. Chmielewski, J.L. Kulikowski, A. Nowakowski, M. Nałęcz (red.), Biocybernetyka i inżynieria biomedyczna 2000, tom 8, Obrazowanie biomedyczne, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2003.
2. J.G.Webster (red.), Medical Instrumentation. Application and Design, John Wiley & Sons, inc. New York 1998
3. Inżynieria biomedyczna, kwartalnik Polskiego Towarzystwa Inżynierii Biomedycznej

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00