COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ortopedic and rehabilitation engineering

Course

Field of study

Biomedical engineering

Area of study (specialization)

-

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1 / 1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Institute of Applied Mechanics

Faculty of Mechanical Engineering

Poznan University of Technology

Responsible for the course/lecturer:

Prerequisites

1. Basics knowledge in mechanics, biomechanics, computer science, technical drawing, human anatomy.

2. Skills of logical thinking, use of information obtained from the literature, the Internet and other sources.

3. Understanding the need for learning and acquiring new knowledge.

Course objective

To familiarize students with the basic knowledge in the field of engineering approach in equipment design for the needs of orthopedics and rehabilitation.

Course-related learning outcomes

Knowledge

1. Student has knowledge related to motor orthopedic and rehabilitation engineering.

2. Student has knowledge related to prostheses, orthoses and other equipment used in orthopedics and rehabilitation.

3. Student has knowledge related to equipment used in medicine, particularly related to orthopedics and human rehabilitation.

4. Student has fundamental knowledge of the life-cycle of devices, structures and technical systems.

Skills

1. Student can obtain information from literature, databases and other properly selected sources (also in English or another foreign language) in the area of biomedical engineering.

2. Student can design and use prostheses, orthopedic and supportive devices in motor rehabilitation.

3. Student can make use of simulation and experimental methods to formulate and solve engineering tasks and simple research problems related to biomedical engineering.

4. Student can, when formulating and performing engineering tasks in biomedical engineering, integrate knowledge of biomedical engineering and apply a systemic approach, taking also into account non-technical aspects.

Social competences

1. Student is aware of the validity and understanding of non-technical aspects and results of engineering activity.

2. Student can cooperate and work in a group, adopting various roles.

3. Student can set priorities regarding the performance of a given task by him/herself or others.

4. Student can think and act in a creative and entrepreneurial way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture – Credit based on an exam consisting of test questions. A total of 100 points can be obtained. Exam grade based on the following grading scale::

2 (not enough) <0 points; 50 points>

3 (sufficient) (50 points; 60 points>

3+ (positive plus) (60 points; 70 points>

4 (good) (70 points; 80 points>

4+ (good plus) (80 points; 90 points >

5 (very good) (90 points; 100 points>

Project – Credit based on the developed project and ongoing control of project progress. The credit is obtained on the basis of partial grades and the evaluation of the final project submitted to the teacher. Depending on the obtained sum of points and resulting percentage, the following scores are awarded:

2 (not enough) <0%; 50%>

3 (sufficient) (50%; 60%>

3+ (positive plus) (60%; 70%>

4 (good) (70%; 80%>

4+ (good plus) (80%; 90%>

5 (very good) (90%; 100%>

Programme content

Lecture:

1. Introduction. Basics of disability.

2. Orthotics and prosthetics of the upper limb.

3. Orthotics and prosthetics of the lower limb.

4. Equipment for transport and recreation of the disabled - wheelchairs, patient transfer devices, sports equipment.

5. Everyday devices intended for the disabled, including kitchen and bathroom equipment.

Project:

Issues to be developed in the form of a project in a group of two people. The subject of the project is determined individually. Each project should include a theoretical study and a design of a prosthesis / orthosis or other orthopedic / rehabilitation equipment in a CAD type program with FEM strength analysis.

Teaching methods

1. Lecture: multimedia presentation supported by examples.

2. Project: solving practical problems, searching for sources (standards and patents), discussion.

Bibliography

Basic

1. J.R. DĄBROWSKI (ed): Inżynieria ortopedyczna i rehabilitacyjna, Wydawnictwo Politechnika Białostocka, Białystok 2008 (in Polish).

2. W.S. ERDMANN: Inżynieria rehabilitacji ruchowej. Zarys, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016 (in Polish).

3. K. GIEREMEK, S. JANICKI, B. PRZEŹDZIAK, M. WOŹNIEWSKI (ed.): Wyroby medyczne. Zaopatrzenie indywidualne, Wydawnictwo Lekarskie PZWL, Warszawa 2016 (in Polish).

Additional

1. BĘDZIŃSKI R., KĘDZIOR K., KIWERSKI J., MORECKI A., SKALSKI K., WALL A., WIT A. (red.): Biomechanika i inżynieria rehabilitacyjna, Wyd. Komunikacji i Łączności, Warszawa 2004 r. Publikacja z serii: Biocybernetyka i inżynieria biomedyczna 2000, pod redakcją Macieja NAŁĘCZA (tom 5) (in Polish).

2. Patents and standards in the areas of orthopedic and rehabilitation engineering.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,6
Student's own work (literature studies, preparation for classes (projects), preparation for exam, project preparation) [1]	35	1,4

[1] delete or add other activities as appropriate