COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mechano and balneotherapy [S2IBio1>MiB]

Course

Field of study
Biomedical Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-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

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Lecturers

Prerequisites

Basic knowledge of human anatomy and physiology, as well as biophysics and biochemistry

Course objective

Development of knowledge on the use of various devices for physical therapy used in the treatment of various diseases in spa medicine. the impact of various physical stimuli, materials and climate on the human body as well as indications and contraindications for the use of various physical treatments, including spa treatment.

Course-related learning outcomes

Knowledge:
has knowledge related to IT systems in medicine, covering systems of medical electrodiagnostics and imaging diagnostics;
has knowledge related to testing methods to assess physical and mechanical properties of biomaterials and tissues: static, cyclic stress and others, testing methods to assess microstructure: optical microscopy, scanning electron microscopy, transmission electron microscopy, X-ray diffraction, testing methods to assess biomaterial surfaces;

has knowledge related to equipment used in medicine, particularly related to medical robots, laser devices, developmental trends and the most significant recent advances in biomedical engineering;
knows and understands basic terms related to the protection of industrial property, copyright and intellectual property; can make use of patent information sources;
knows general principles followed in creating and developing forms of individual enterprise, drawing upon knowledge related to science and scientific disciplines typical of biomedical engineering;

Skills:
can specify paths for further study and learn independently;
can assess the usefulness and possible application of new materials, technologies and constructions related to biomedical engineering;
is adequately prepared to work in the medicine-related industry and medical centres; can select and operate medical equipment found in operating theatres and doctor's offices, including robots and laser devices; is skilled in managing staff and production processes;
can perform a critical analysis of the way of functioning and evaluate – particularly in relation to biomedical engineering – the existing technical solutions, especially devices, processes and materials;

Social competences:
understands the need for lifelong learning; can inspire and organize the learning process of others;
can cooperate and work in a group, adopting various roles;
can set priorities regarding the performance of a given task by him/herself or others;
is aware of the social role played by a technical university graduate; understands the need to formulate and convey to society, in particular by means of the mass media, information and opinions related to technological advances and other aspects of engineering activity; makes an effort to pass the said information and opinions in an understandable way, taking into account various viewpoints;

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Credit for the lecture is based on a test of the program content presented in the lectures (credit based on the correct answer to the questions: 5.0 -100-95%; 4.5-94-85%; 4.0 84-75%; 3, 5- 74-65%; 3.0- 64-50%; 2.0 below 50%).
Completion of the project part of the subject is based on the presentation of the design of the rehabilitation equipment and the presentation of the construction concept together with the assumptions of the student group - the project should include a technical drawing of the designed device or equipment, selection of materials and analysis of loads and displacements.

Programme content

Lecture:
1.Natural healing agents (division)
a / mineral waters, b / natural materials - peloid, volcanic lava, healing clays, peloid paste - chemical composition, therapeutic effect and types of treatments: baths, half-baths, wraps, wraps
Discussion of the chemical composition, lectures are aimed at acquainting with the chemical composition, the type of treatments, the use of various mineral waters (drinking treatments, therapeutic baths)
therapeutic effect of the above-mentioned treatments, therapeutic indications and contraindications
2. Location of health resorts in Poland with an overview of indications and contraindications for spa treatment.
Overview of natural therapeutic measures used in individual types of spas
breakdown of selected spas depending on the geographical location: a / seaside, b / lowland, c / piedmont, d / mountain
3. Importance of climate in spa treatment. Thalasso therapy, heliotherapy, sauna, Scottish shower, water gymnastics
Seminars, exercises:
1. Discussion of selected equipment used in balneology with a review and analysis of equipment available on the market
2. Determining the goal and assumptions of the project, including the possibility of modifying the design, with regard to the anatomy of the human body and its biomechanics, as well as physiological

processes in the case of designing medical equipment
3. Designing equipment with the use of CAD computer programs (e.g. designing a shower chair, sauna, whirlpool tub, lifts, devices for mud delivery (mud transport), etc.)
4. Analysis of loads and displacements
5. Presentation and discussion of the completed project

Course topics

none

Teaching methods

1. Lecture: multimedia presentation, films
2. Seminars: solving practical problems, team work, discussion

Bibliography

Basic
1. Ortopedia i Rehabilitacja, tom I i II, pod redakcją W. Marciniaka, A. Szulca, PZWL, Warszawa, 2003.
2. Rehabilitacja medyczna, II wydanie, pod redakcją W. Degi i K. Milanowskiej, Wydawnictwo PZWL, Warszawa, 1993
3. Rehabilitacja medyczna, t. I i II pod redakcją Andrzeja Kwolka, 2003
4. Rehabilitacja medyczna, I wydanie, pod redakcją Jerzego Kiwerskiego, Wydawnictwo Lekarskie PZWL, Warszawa, 2006
Additional
1. C. Liebenson: Rehabilitation of the spine a practitioner? s Manual, W:Lippincott Williams& Wilkins, 2006
2. Lisa Maxey: Rehabilitation for the postsurgical orthopedic Patient 2e, W: Mosby, 2007
3. R. C. Manske: Postsurgical orthopedic sports rehabilitation, W.Mosby 2006
4. T. S. Ellenbecker: Shoulder rehabilitation,W: Georg Thieme Verlag 2006Michael A. Pagliarulo: Introduction to physical therapy, W: Elsevier Science Publishers 2006

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