COURSE DESCRIPTION CARD - SYLLABUS

Course name
Support engineering for disabled people [S1MiBP1>IWON]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: basic knowledge of technology Skills: logic thinking, the use of information obtained from internet, standards, catalogues Social competences: bases skills action in team, understanding of the need for an example of knowledge.

Course objective

Getting basic knowledge about: structure, action and the importance of development and technique design of means dedicated to disabled persons and older age people

Course-related learning outcomes

Knowledge:
Has elementary knowledge of the impact of technology changes on the organization of social life as well as the health and psyche of individuals in human-machine contact.
Has basic knowledge in the field of chemistry, in the construction of the periodic table of elements and their properties, the theory of chemical bonds, organic and inorganic compounds, types of chemical reactions, chemical analysis: in the scope enabling understanding of lectures on metal and non-metal materials, protection sciences environment, fuels and lubricants, building materials and soil,

biomechanics and biological materials processed by agricultural and food machinery.
Is aware of the latest trends in machine construction, i.e. automation and mechatronization, automation of machine design and construction processes, increased safety and comfort of operation, the use of modern construction materials.

Skills:
Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.
Can organize and substantively manage the process of designing and operating a simple machine from a group of machines from the group covered by the selected diploma path.
Can interact with other people as part of teamwork (also of an interdisciplinary nature).

Social competences:
Is ready to critically assess his knowledge and received content.
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.
Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: written test - colloquium
Laboratory classes: credit based on a test, homework and activity during classes

Programme content

Problem section of rehabilitation engineering and assistive technology
Technique measure in medical, social and professional rehabilitation
Concept of disability
Contemporary reasons research and design technique measure in rehabilitation engineering
Statistics and reasons request for technique measures rehabilitation engineering
Design for people with disabilities – design process, design work team, design principles, examples.
Biomechanics – definition, space of work
Human operational potential – elements, functions
Biocinematic chain, number of degrees of freedom, locomotor system of human, moment biomechanism
Center of gravity
Basic features and structure of supporting devices (definition geometry and cinematics based on anthropometrical features of human, control methods of devices, choosing materials).
Wheelchairs – definition and classification
Wheelchairs – functions, structure, progress and tendencies
Modular construction, construction series based on manual wheelchair:
Design of frame active wheelchair (dimensions, structure of construction nodes).
Requirements regarding using type active wheelchair (support of spine, support of human body, ideal position of body)
Energy efficiency and wheelchair dynamics.
Individual means of transport and collective disabled persons.
Devices supporting in means of transport – functions, application, universal design principles.
Principles of construction technical measures dedicated to disabled persons and older age people.
Rehabilitation devices (wheelchairs, car, means of collective transport, hospital beds, rehabilitation equipment, lifts, medical rehabilitation gear)

Course topics

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Teaching methods

1. Lecture with a multimedia presentation (a form of an information lecture with elements of a problem-based and conversational lecture)
2. Laboratory classes - credit based on a test, own homework and activity in the classroom (using the classic problem method, case study, discussion, practical exercises)

Bibliography

Basic
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Sydor M., Wybór i eksploatacja wózka inwalidzkiego, Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu, Poznań 2003
Additional
Biomechanika i inżynieria rehabilitacyjna, red. R. Będziński i inni, Wyd. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2004
Paśniczek R., Wybrane urządzenia wspomagające i fizjoterapeutyczne w rehabilitacji porażeń ośrodkowego układu nerwowego i amputacjach kończyn, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1998
Marciniak J., Szewczenko A., Sprzęt szpitalny i rehabilitacyjny, Wydawnictwo Politechniki Śląskiej, Gliwice 2003

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,50