COURSE DESCRIPTION CARD - SYLLABUS

Course name
Design PCB and assembly of electronics [S1Mech2>PPiME]

Course

Field of study
Mechatronics

Year/Semester
2/4

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
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Basic knowledge of electronics, electronic device design. Skills: Ability to read and perform electrical diagrams Social competencies: Understanding the importance of electronics for the development of the country's economy. Awareness of necessity for broadening knowledge and skills.

Course objective

Understanding the basic manufacturing methods and principles of electronic circuit design.

Course-related learning outcomes

Knowledge:
1 Getting to know the methods of producing printed circuits
2 Analysis of selected integrated circuits and electronics passive components
3 Getting to know CAD design methods for electronic diagrams
4 The use of IT tools to design electronic diagrams

Skills:
1 Implementation of printed circuits using prototype methods

2 Soldering of electronic circuits
3 Launching designed electronic circuits

Social competences:
1 Understanding the requirement of learning by whole life; ability to inspire and organize learning process of other people.
2. Is aware of the role of automation in the modern economy and its significance for the development of society and the environment.
3 Ability to think and act in a creative and enterprising way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Completion of an electrical schematic and PCB design according to the assigned topic, in the presence of the instructor.
Laboratory: Passing based on the correct completion of exercises and the preparation of reports for each laboratory exercise according to the instructor's guidelines. Short entrance tests are planned before selected exercises. To pass the laboratory, all exercises must be successfully completed.
Project: Completion of a project, including the design, assembly, and launch of a physical PCB.

Programme content

The course covers getting acquainted with PCB manufacturing methods and designing electronic schematics using CAD tools. Students learn the principles of schematic creation, selecting IC packages and passive components, as well as soldering and assembly techniques. During the course, they design, build, and launch their own electronic circuits. The course concludes with each student presenting their completed project.

Course topics

1. Getting acquainted with printed circuit board (PCB) manufacturing methods.
2 Learning about types of integrated circuit (IC) packages and passive electronic components.
3. Familiarization with CAD methods for designing electronic schematics.
4. Principles of creating electronic schematics.
5. Using IT tools for designing electronic schematics.
6. Prototyping printed circuit boards.
7. Soldering electronic circuits.
8. Launching the designed electronic circuits.
9. Designing a printed circuit board for an electronic system by students.
10. Creating schematics for the designed electronic system.
11. Manufacturing printed circuit boards and soldering components onto the board.
12. Presentation of the completed circuit by the student as the final course requirement.

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on a board, discussion and problem analysis.
2. Laboratory exercises: practical exercises, problem solving, discussion, teamwork
3. Design: making your own electronic system

Bibliography

Basic:
1. 20 prostych projektów dla elektroników, Górski K., BTC, 2008
2. Lutowanie bezołowiowe, Hackiewicz H., Bukat K., BTC, 2007
3. Podstawy technologii dla elektroników - Poradnik praktyczny, Kisiel R., BTC, 2005

Additional:
1. Elementy i układy elektroniczne w pytaniach i odpowiedziach, Pasierbiński J., Rusek M., WNT, 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00