CAD of Electronic Circuits - course description

General information

Course name	CAD of Electronic Circuits
Course ID	06.6--AutP-CADUE-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Automatic Control and Robotics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2022/2023

Course information

Semester	6
ECTS credits to win	2
Course type	optional
Teaching language	english
Author of syllabus	• dr hab. inż. Janusz Kaczmarek, prof. UZ

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	15	1	-	-	Credit with grade
Lecture	15	1	-	-	Credit with grade

Aim of the course

- To familiarize students with the basics of designing electronic circuits using EDA software
- Shaping skills in editing schematic diagrams and performing computer simulation of electronic circuits
- Shaping skills in designing the printed circuit boards

Prerequisites

- Electronics principles
- Foundations of digital and microprocessor engineering

Scope

Methodology of designing an electronic circuit using EDA system. Basic concepts on capturing a circuit as a schematic diagram: netlist, wires and buses. Component library structure: part, symbol, package and padstack. Printed Circuit Board designing using layout editor. Methods of placing components and routing traces. Designing one, two and multilayer PCB. Automatic routing of PCB traces with an autorouter tool. Design rule check in EDA systems.

Computer simulation of electronic circuits. SPICE simulation fundamentals. Types of simulation analysis: nonlinear dc, small signal ac, transient. Models of electronic devices. Analysis of simulation results.

Producing design documentation and CAM files in EDA systems.

Teaching methods

Lecture: conventional lecture

Laboratory: laboratory exercises, group work

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Can design printed circuit boards with manual and automatic routing		• an evaluation test • an ongoing monitoring during classes • carrying out laboratory reports	• Lecture • Laboratory
Knows design methodology of electronic circuits with EDA software.		• an evaluation test	• Lecture
Can create technical documentation of a designed device and generate the files needed to produce the printed circuit board.		• an evaluation test • an ongoing monitoring during classes • carrying out laboratory reports	• Lecture • Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Student is able to design and carry out simulation studies of electronic circuits using EDA software.		• an evaluation test • an ongoing monitoring during classes • carrying out laboratory reports	• Lecture • Laboratory

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Calculation of the final grade: lecture 50% + laboratory 50%

Recommended reading

1. Krzyżanowski R.: Microprocessor circuits, Wydawnictwo Naukowe PWN, Warszawa, 2017 (in Polish).
2. Horowitz P., Hill W., The Art of Electronics, Cambridge University Press, 2015.
3. Rymarski Z., Materials technology and construction of electronic circuits. Designing and production of electronic circuits, Wydawnictwo Politechniki Śląskiej, Gliwice, 2000 (in Polish).
4. Dobrowolski A., Under the mask of SPICE, BTC, Warszawa, 2004 (in Polish).

Further reading

1. Wilson P.: The Circuit Designer's Companion, Newnes, 2017.

Notes

Modified by dr hab. inż. Wojciech Paszke, prof. UZ (last modification: 11-04-2022 09:05)

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