STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Electronics Computer Aided Design	**1010802121010832891**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electronics and Telecommunications	**general academic**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Information and Communication	**English**	**elective**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **2** Classes: **-** Laboratory: **2** Project/seminars: **-**	**5**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
major	**from field**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**5 100%**
Technical sciences	**5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Has a basic knowledge of the fundamentals of circuit theory, together with necessary mathematical background; this knowledge allows him/her to understand, analyze and evaluate the operation of electrical circuits. Has a basic knowledge about basic electronic elements and theirs characteristics. Have very basic knowledge about measurements and metrology.
2	**Skills**	Is able to extract information from Polish or English language literature, databases and other sources. Is able to use known mathematical analysis, algebra and theory to solve basic problems in electronics.
3	**Social competencies**	Is aware of the limitations of his knowledge and skills; is committed to further self-study. Is active in solving technical electronics problems. Is able to consulting in group.

Assumptions and objectives of the course:

Computer Aided Design in electronics. SPICE - a general-purpose circuit simulation program for nonlinear DC, nonlinear transient, and linear AC analyses. Models of decices: resistors, capacitors, inductors, independent and dependent voltage and current

sources, switches, the most common semiconductor devices: diodes, BJTs, JFETs,

MESFETs, and MOSFETs.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a systematic knowledge, with the necessary theoretical background, of optimization methods used in solving engineering problems. - [K2_W03]

2. Is conversant with numerical methods used in electronics and telecommunication. - [K2_W07]

Skills:

1. Is able to communicate freely in English. Is able to discuss professional matters in English; is able to use knowledgeably English language sources (books, technical and scientific journals, application notes, catalogues, instructions, standards, etc.). - [K2_U01]
2. Is able to prepare a scientific paper or technical report and give a presentation (in English or in Polish) on solving a problem in the area of electronics and/or telecommunication; is able to participate in a discussion related to the presented problem. - [K2_U02]
3. Is able to apply optimization methods to solve problems in electronics and telecommunication. - [K2_U05]
4. Is able to select adequate numerical methods and simulation methods to solve typical tasks related to analysis, design and optimization of systems and computational tasks in telecommunication. - [K2_U09]
Social competencies:
1. Understands the legal framework of Polish and international standards in electronics and telecommunications. - [K2_K03]
2. Is aware of the limitations of his/her current knowledge and skills; is committed to lifelong learning. - [K2_K04]
3. Is aware of the necessity to approach solving technical problems with responsibility and professionalism. - [K2_K05]

Assessment methods of study outcomes
1. Projects
2. Reports from laboratory execercises
3. Activity durning labs
Course description
- Basic analyes: DC, AC, Transient and FFT analysies.
- Parametric analysie.
- Temperature analysie.
- Worst Case and Monte Carlo analysies.
- Noise analysie.
- Models of basic electronic passive devices (resistor, capacitor, inductor) used in CAD programms.
- Models of active elements (dioda, Zener dioda, bipolar transitor, unipolar transistor).
- Models of voltage and current sources (DC, AC, SIN, PULSE, EXP)
- Models i macromodels OpAmp.
- Models of devices used in SPICE and APLAC.
Basic bibliography:
1. Baranowski K., Matuszczyk M., Welo A., Symulacja układów elektronicznych: PSpice pakiet DESIGN CENTER, MIKOM, Warszawa, 1996.
2. Dobrowolski A., Pod maską Spicea. Metody i algorytmy analizy układów elektronicznych, BTC, 2004.
3. Michalak S., Symulacja układów elektronicznych w środowisku APLAC, Wydawnictwo PP, Poznań, 2005.
Additional bibliography:
1. Porębski J. Korohoda P., SPICE program analizy nieliniowych układów elektronicznych, WNT, Warszawa, 1996.
2. Zachara Z., Wojtuszkiewicz K., PSpice: symulacje wzmacniaczy dyskretnych, MIKOM, Warszawa, 2001.
3. Sidor T., Komputerowa analiza elektronicznych układów pomiarowych, Kraków, Wydawnictwo AGH, 2006.
4. Walczak J., Pasko M., Komputerowa analiza obwodów elektrycznych z wykorzystaniem programu SPICE: zagadnienia podstawowe, Wydawnictwo Politechniki Śląskiej, Gliwice, 2002.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Labs	30
3. Reports	30
4. Preparation for the exam	30
5. Consulting with the lecturer	3
6. Participation in the exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2

Practical activities	50	2