



Subject card

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|---|--|--|--|-------------------------------------|---------|---|-----|
| Subject name and code | Engineering of Integrated Circuits and Systems, PG_00048077 | | | | | | |
| Field of study | Electronics and Telecommunications | | | | | | |
| Date of commencement of studies | October 2020 | | Academic year of realisation of subject | | | 2022/2023 | |
| Education level | first-cycle studies | | Subject group | | | Optional subject group Subject group related to scientific research in the field of study | |
| Mode of study | Full-time studies | | Mode of delivery | | | at the university | |
| Year of study | 3 | | Language of instruction | | | Polish | |
| Semester of study | 5 | | ECTS credits | | | 4.0 | |
| Learning profile | general academic profile | | Assessment form | | | assessment | |
| Conducting unit | Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Bogdan Pankiewicz | | | | |
| | Teachers | | dr hab. inż. Waldemar Jendernalik | | | | |
| | | | dr hab. inż. Bogdan Pankiewicz | | | | |
| | | | dr hab. inż. Jacek Jakusz | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 15.0 | 0.0 | 45 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 45 | | 4.0 | | 51.0 | 100 |
| Subject objectives | Main aim of the subject is introduction to design of integrated circuits and systems. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | | Method of verification | |
| | [K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems | | knows the basic principles of designing analog and digital integrated circuits, knows the limitations resulting from the technology used, is able to estimate the speed of work as well as the consumed power of the digital circuit in the core and on external terminals | | | [SW1] Assessment of factual knowledge | |
| | [K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions | | can design integrated circuit, can make electrical simulation and choose correct technology, can design electrical schematic and layout, can estimate speed and power consumption | | | [SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment | |
| | [K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum | | knows the syntax of PSPICE files, types of possible simulations, ways of describing analog and digital circuits, and methods of simulating electronic circuits | | | [SW1] Assessment of factual knowledge | |

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| Subject contents | 1. IC technologies, technological processing steps, process scenario. 2. Design rules. 3. Passive and active components in integrated circuits. 4. IC cost of design, prototyping and volume production. 5. IC defects and process yield. 6. Technology window of the process. 7. Relative and absolute device mismatches. 8. Methods of matching devices in IC technology. 9. Parasitic phenomenon. 10. AnalAnalog I/O circuits. 11. Digital I/O circuits. 12. Noise coupling, noise margin. 13. Power dissipation and temperature considerations. 14. Circuit extraction. 15. PSPICE circuits simulations. | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | lecture | 51.0% | 50.0% |
| | project | 51.0% | 25.0% |
| | labs | 51.0% | 25.0% |
| Recommended reading | Basic literature | R. L. Geiger, P. E. Allen, N. R. Strader, VLSI design techniques for analog and digital circuits, McGraw-Hill 1990. Matching properties of MOS transistors, M. Pelgrom, A. Duinmaijer, A. Welbres, IEEE Journal of Solid-State Circuits, vol.. 24, no. 5, October 1989 J. Izydorczyk, PSpice komputerowa symulacja układów elektronicznych, Helion, 1993 C. Wai-Kai (editor), The VLSI Handbook, Taylor & Francis Group, 2007 | |
| | Supplementary literature | No requirements | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | | | |
| Work placement | Not applicable | | |