GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Electronic Cards and Modules Design, PG_00048102 | | |
| Field of study | Electronics and Telecommunications | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | 2026/2027 |
| Education level | first-cycle studies | Subject group | Optional subject group<br>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 | 4 | Language of instruction | Polish |
| Semester of study | 7 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Metrology and Electronic Systems Department -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Grzegorz Lentka | |
| | Teachers | mgr inż. Dariusz Palmowski | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 30 |

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 8029 Projektowanie pakietów elektronicznych 2026/2027
https://enauczanie.pg.edu.pl/2025/course/view.php?id=8029

**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 | 30 | 2.0 | 18.0 | 50 |

**Subject objectives**

Familiarize students with the rules of design of electronic cards and module design.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment | The student is able to prepare the design and documentation of the device in the package system. | [SU4] Assessment of ability to use methods and tools<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU1] Assessment of task fulfilment |
| [K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems | The student knows and is able to use CAD programs in the preparation of the project and device documentation in the package system. | [SW1] Assessment of factual knowledge |

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| Subject contents | Course content – lecture<br><br>Introduction. Exam rules. Literature. Definition of the module. Particularity of the module designs. Stages of the design process. Computer aided design of mechanical of modules – AutoCAD, A9Cad.<br><br>Review of advanced computer aided design of electronic boards (diagram, simulation, layout). Problems of electronic card designing using of Multilayer PCB and SMT technology. Principles of preparation of mechanical, electrical and mechanical documentation. Documentation of PCB cards. Mechanical and electrical standards of the modules – inches and centimeters unit. Examples of 19” modules (IEC60297). Eurocard modules. Examples of design printed boards, plug-in units, subracks, cabinets and enclosures. Supplementary products. Grounding, shielding and cooling of the modules. Enclosures – IP degree of protection, flammability, tests of electromagnetic shielding efficiency, climatic tests, static load and dynamic tests. Safety requirements. Examples of the modules made by Schroff company. Internal buses in the modules – CAMAC, VMEbus, MultibusII, VXIbus at all. Review of external buses standards (UART 16550, PCF series at all). Modules supply. Mains, battery and uninterrupted power supply. Examples of the module equipment – data acquisitions and control systems. |
| Prerequisites and co-requisites | |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Coloquium | 50.0% | 50.0% |
| Laboratory | 50.0% | 50.0% |

Recommended reading

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| Basic literature | Materiały firmowe Schroff (http://www.schroff.pl/internet/html_pl/index.html):<br><br>Standards Summary, Electronics Packaging (Main Catalog), System Solutions.<br><br>Maciej Sydor. Wprowadzenie do CAD. Podstawy komputerowo wspomaganego projektowania. Wydawnictwo Naukowe PWN. Warszawa 2009.<br><br>Jan Burcan. Podstawy rysunku technicznego. WNT Warszawa 2006. |
| Supplementary literature | Sebastian Wilczewski. MS Project 2010 i MS Project Server 2010. Efektywne zarzadzanie projektem i portfelem projektów. Helion. Gliwice 2011.<br><br>Tadeusz Sidor. Komputerowa analiza elektronicznych układów pomiarowych. AGH Uczelniane Wydawnictwa Naukowo-Dydaktyczne. Kraków 2006.<br><br>Waldemar Oleksiuk, Krzysztof Paprocki. Konstrukcja mechanicznych zespołów sprzętu elektronicznego. WKiŁ Warszawa 1997.<br><br>Ryszard Kisiel. Podstawy technologii montażu dla elektroników. BTC Legionowo 2012. |
| eResources addresses | |

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| Example issues/ example questions/ tasks being completed | |
| Practical activites within the subject | Not applicable |

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