GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer-Aided Design, PG_00047767
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering

Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Department Of Metrology And Optoelectronics -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Arkadiusz Szewczyk
	Teachers	dr inż. Barbara Stawarz-Graczyk
		dr inż. Arkadiusz Szewczyk

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60	12.0	53.0	125

Subject objectives	Familiarize students with the rules of design of electronic circuits using computer-aided design software (CAD) with regard to the selection of components, design solutions and manufacturing technology.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	is able to use his knowledge of programming methods and techniques, and select and apply appropriate programming methods and tools in device design and software development	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	is able to design, in accordance with the given specification, and build an electronic device using appropriately selected methods, techniques, tools and materials	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	knows and understands at an advanced level the principles, methods and techniques of using software for designing electronic devices, including microprocessor devices	[SW1] Assessment of factual knowledge

Subject contents	Introduction. Literature. Specificity of project design of electronic biomedical devices and systems. Elements of designing. Principles of preparation of electric and mechanical documentation. Documentation of mechanical construction. Principles of modeling and dimensioning. Simplification geometric form and dimensioning (measurements). Reading of drawing in process of creation of mechanical documentation. CAD/CAM systems. Characteristic of AutoCAD program. Methods of modifications and transformation of drawing. Examples of mechanical pack constructions – 19'' modules (IEC60297). Units, cassettes, shelves and cabinets. Eurocard standards of packages. Cabinets – material, codes IP (IEC60259,) NEMA250. Classes of fireproof. Grounding, shielding and cooling. Optimization of project of printed circuits technique of assembly of electronic components. Design of soldering pads. Influence of technique of connection of components on printed cicruits boards. Specificity of project design of analog and digital printed circuit boards. Presentation of CAD program for computer project design. Principles of project designs. Schemes – principle of drawing. Elements of schematic. Show of flow of signal and supply. Verification of correctness of scheme. Lists of connections. Computer verification of correctness of operations. Optimization of technical parameters of connections. Optimization of connections. Design of path of ground and supply. One- and multilayer printed circuit boards. Computer preparation of production documentation. Files for steering numeric drill and photoploter. Preparation of software (programming) for automatic assembly of electronic components.

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lectures	50.0%	40.0%
	Laboratory	100.0%	30.0%
	Exercises	100.0%	30.0%

Recommended reading	Basic literature	Maciej Sydor. Wprowadzenie do CAD. Podstawy komputerowo wspomaganego projektowania. Wydawnictwo Naukowe PWN SA. Warszawa 2009. Jan Burcan. Podstawy rysunku technicznego. WNT Warszawa 2006. Maciej Olech. PADS a praktyce. Nowoczesny pakiet CAD dla elektroników.BTC Legionowo 2010.
	Supplementary literature	Paul Horowitz, Winfield Hill. The Arts of Electronics. Cambridge University Press 1993.
	eResources addresses	Adresy na platformie eNauczanie: Komputerowe wspomaganie projektowania - r. akad. 2023/24 - Moodle ID: 30674 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30674

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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