GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer aided design, PG_00057704		
Field of study	Green Technologies		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Iwona Cichowska-Kopczyńska	
	Teachers	dr inż. Iwona Cichowska-Kopczyńska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	45.0	0.0	45

E-learning hours included: 0.0

Additional information:
Attendance and Making Up Missed Work

1. **Attendance at classes is mandatory.**
2. **Absences are excused only** upon presentation of a **medical certificate**.
3. **One unexcused absence per semester** is permitted.
4. **An absence does not exempt a student** from the obligation to make up missed coursework.
5. **Content from missed classes must be mastered independently** before the first class after the student returns.
6. **The scope and form of making up missed work** (e.g., consultations, additional assignments, submission of outstanding reports) **are determined by the teacher**.

The provisions of this section constitute an integral part of the course specification and are binding on all participants.

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	2.0	28.0	75

Subject objectives	The course aims to familiarise students with the capabilities offered by computer-aided design and engineering software (CAD/CAE) and with the principles for selecting tools to solve specific engineering problems. It develops the ability to apply design-process algorithmsfrom requirements formulation, through modelling and variant analysis, to validation and documentation of solutions. In addition, the course introduces the use of software for project management, documentation design, and team collaboration. Students learn to define objectives and milestones; create work schedules and allocate tasks; monitor and evaluate progress using reporting and simple indicators; collaborate in teams with communication tools, shared documentation, and version control; and conduct **peer assessment** of individual contributions and task quality. The course prepares students to carry out project work independently and in teams using modern digital tools in an engineering environment.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions.	Students know how to correctly identify risk factors and impacts. They understand the basic principles of sustainable development (including elements of the circular economy and eco-design) and their importance in engineering design.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_W07] has knowledge of basic terminology and principles of intellectual property protection necessary for proper interpretation and application in practice	The student is able to correctly use the terminology of the subject, is able to follow the rules of intellectual property and copyright, and is able to quote correctly sources	[SW3] Assessment of knowledge contained in written work and projects
[K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions	The student is able to assess the impact of various factors and technological parameters on the environment, including the economic environment, the natural environment, and the work environment. Is able to analyze risk and propose a method to minimize the impact of negative aspects.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents	The course combines computer-aided design (CAD/CAE) with process simulations and elements of project management. It emphasises selecting appropriate tools to solve specific engineering problems and the algorithms of the design processfrom requirements definition, through modelling and variant analysis, to validation and preparation of complete documentation. Thematic blocks **Project management and team collaboration** Defining objectives and milestones, building schedules, task allocation, monitoring and evaluation of progress (reports, indicators), team communication, shared documentation and version control; peer assessment of contributions and task quality. **Graphical representation of technological processes** Use of 2D CAD software to depict processes, diagrams and equipment. Projection as the basic method of mapping three-dimensional objects onto a plane; orthographic projections; sections and intersections of planar and spatial objects; dimensioning and notation rules in technical drawing. **Process simulations** Thermodynamic models, material and energy balances, principles of running simulations, sensitivity analysis, what-if scenarios, and optimisation of simple process systems. Equipment design. **3D modelling** Spatial structures of equipment. **Technical drawing and documentation** Spatial, assembly and manufacturing drawings; bills of materials (BOM); documentation design. **Non-technical aspects and engineering responsibility** OHS principles in design and laboratory work; elements of environmental protection and sustainable development (introductory environmental indicators); preliminary economic analysis (basic CAPEX/OPEX) as well as fundamentals of intellectual property and licence compliance in projects. Semester structure **Part I:** tool-focused workshopsCAD/CAE, fundamentals of drawing and documentation, introduction to process simulation, and to project-management and team-collaboration tools. **Part II:** execution of a project task with team collaboration using the tools learned; milestone reviews, verification of models and documentation, presentation of results. Deliverables and requirements • Drawing package: process block diagrams, 3D design + assembly/manufacturing drawings, BOM. • Simulation model: statement of assumptions, results, sensitivity analysis, conclusions. • Material and energy (M&E) balances and a brief note on variant optimisation. • Project documentation using the provided template. • Project plan: objectives, milestones, schedule, progress and risk reports. • Peer assessment. • Appendices: safety sheets, outline of environmental aspects, and a preliminary economic analysis.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Computer literacy, ability to save and open files, copy, create archives, use e-mail, knowledge of the Office suite, geometry, dimensioning principles, basics of thermodynamics, process engineering, chemical technology, technological principles, principles of green chemistry, green engineering, chemical industry equipment</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project and team work</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>Process design</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Simulation design</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>Additional tasks</td><td>60.0%</td><td>20.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">• Giesecke, F.E. et al., Technical Drawing with Engineering Graphics, 15th ed., Peachpit Press, 2016.
• Towler, G., Sinnott, R., Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design, 2nd ed., Elsevier, 2012.
• Smith, J.M.; Van Ness, H.C.; Abbott, M.M.; Swihart, M.T., Introduction to Chemical Engineering Thermodynamics, 8th ed.,
• ISO standards</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Pikoń J., AutoCAD 2002, Helion, Warszawa 2002.
2. Tarnowski Wojciech, Symulacja komputerowa procesów ciągłych, Koszalin, Wyższa Szkoła Inżynierska
w Koszalinie 1996.
3. A. Jaskulski, Autodesk Inventor Professional 2018PL, PWN, 2017</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Graphical representation of the technological process, technological diagram,3D design of the device, simulation of the technological process, process optimization in terms of raw material consumption, waste emissions</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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