GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Compiler Design, PG_00047891		
Field of study	Informatics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Intelligent Interactive Systems -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jan Daciuk	
	Teachers	dr hab. inż. Jan Daciuk	

Lesson types

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

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 7691 Konstrukcja kompilatorów
https://enauczanie.pg.edu.pl/2025/course/view.php?id=7691

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

The aim of the subject is acquisition of skills writing translators, especially compilers, for high level programming languages, as well as understanding their functioning. On completion of the subject, the students should be able to write parsers for a wide range of source codes using scanner generators and parser generators.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 definitions and taxonomy of grammars and formal automata. Can depict functioning of lexical analyzers, parsers, and semantic analyzers. Can explain compiler construction and the role of its components. Can show methods for code optimization. Uses regular expressions for developing scanners. Creates parsers for data and programs.	[SW1] Assessment of factual knowledge
[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	Can design and develop simple aprsers according to specification.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture

1. Formal languages, grammars, Chomskys classification 2. Meta-languages, notion XBNF, automata 3. Translators kinds, models, structure 4. Regular grammars, regular expressions, finite automata 5. Lexical analysis 6. Scanners generators 7. Context-free grammars, deterministic automata 8. Syntactic analysis LR 9. Syntactic analysis LL 10. Parsers generators 11. Syntax-directed translation 12. Target environment, memory management 13. Semantic analysis, code generation and optimization 14. Translation and evaluation of logical-arithmetic expressions 15. Final exam</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>Presence and activity</td><td>51.0%</td><td>10.0%</td></tr>
<tr><td>Colloquium</td><td>51.0%</td><td>40.0%</td></tr>
</table>
</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Aho A.V., Hopcroft J.E. Ullman J.D, Projektowanie i analiza algorytmów komputerowych, Państwowe Wydawnictwo Naukowe, 1983 2. Aho A.V., Sethi R., Ullman J.D., Kompilatory. Reguły, metody i narzędzia, Wydawnictwa Naukowo-Techniczne, Warszawa, 2002 3. Szwoch M.: Języki formalne, automaty i translatory, PWNT, Gdańsk, 2008</td></tr>
<tr><td>Supplementary literature</td><td>1. Niklaus Wirth, Algorytmy + struktury danych = programy, WNT, Warszawa, 1980.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Scanners and parsers for subsets of selected programming languages, construction of automata from regular expressions.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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