

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Algorithms and data structures</b>		Code <b>1010341731010340103</b>
Field of study <b>Mathematics in technology</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>30</b> Project/seminars: <b>-</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Karol Gajda email: karol.gajda@put.poznan.pl tel. 2805 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Knowledge from the course Introduction to Programming, Programming Methods, Discrete Mathematics, Logic and Set Theory and Technologies of information (ECDL).
2	<b>Skills</b>	Computer skills, including programming. The ability to effectively self-education in a field related to the chosen field of study.
3	<b>Social competencies</b>	Knowledge of the limits of their knowledge and understanding of the need for further education.
<b>Assumptions and objectives of the course:</b> Design and analysis of algorithms. Overview of basic algorithms and data structures.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Knowledge of the ways of the application of mathematical methods in selected areas of science. - [K_W09] 2. Elementary knowledge of information technology in the field of architecture and software computer systems, the use of basic tools and information technology, as well as knowledge of relational databases - [K_W15]		
<b>Skills:</b>		
1. Is able to formulate an algorithm and use programming languages and tools of information technology. - [K_U20] 2. Can work individually and in a team knows how to estimate the time needed for the commissioned work; is able to develop and implement a work schedule that ensures meeting the deadline. - [K_U29]		
<b>Social competencies:</b>		
1. Knows limitations of their knowledge and understands the need for further education. - [K_K01]		
<b>Assessment methods of study outcomes</b>		

<ul style="list-style-type: none"> <li>- evaluation of knowledge acquired in the lecture</li> <li>- skills assessment related to the implementation of project tasks</li> <li>- evaluation of student preparation for classes and laboratory evaluation of skills related to the implementation of laboratory exercises</li> <li>- evaluation of reports</li> <li>- evaluation of team skills</li> </ul>		
<b>Course description</b>		
<p>The basic principles of analysis algorithms. Basic techniques and structures. Sorting. Selection. Search and simple dictionaries. Effective implementations dictionary. Complex data structures. Graph algorithms. Search pattern in the texts. Textual data structure. NP-completeness.</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Algorytmy i struktury danych, L. Banachowski, K. Diks, W. Rytter, WNT, 2006.</li> <li>2. Wprowadzenie do algorytmów, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, WNT, 2012</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. G. Cornell, C. Horstmann, „Java Podstawy, Helion</li> <li>2. B. Eckel, Thinking in Java. Edycja polska</li> <li>3. D.E.Knuth, Sztuka programowania komputerów, Wydawnictwa Naukowo-Techniczne, Warszawa.</li> <li>4. <a href="http://wazniak.mimuw.edu.pl/index.php?title=Algorytmy_i_struktury_danych">http://wazniak.mimuw.edu.pl/index.php?title=Algorytmy_i_struktury_danych</a></li> </ol>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. participation in lectures (7,5x2 hrs.)	15	
2. participation in laboratory classes (15x2 hrs.)	30	
3. participation in the consultations related to the implementation of the education process, in particular laboratory / project	10	
4. completion (within own work) reports on laboratory exercises	5	
5. write a program / programs, commissioning and verification (time outside of the classroom laboratory)	15	
6. preparation for laboratory exercises	5	
7. preparation for tests / test	5	
8. read with the specified literature / teaching materials	5	
9. exam preparation and participation in the exam	5	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	105	4
Contact hours	55	2
Practical activities	75	3