**The name of the academic discipline:**

**“Algorithms and Data Structures”**

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| **Specialty code and name** | 6-05-0612-01 Software Engineering |
| **Year of study** | 1/2 |
| **Semester of study** | 2/3 |
| **Number of in-class academic hours:** | 118 |
| **Lectures****Seminar classes** **Practical classes****Laboratory classes** | 58 |
| - |
| - |
| 60 |
| **Form of the current assessment (*credit/ graded credit /exam*)** | credit / exam |
| **Number of credit points** | 7  |
| **Competences** | Mastering the academic discipline “Algorithms and Data Structures” should ensure the formation of basic professional competence: using the principles of designing and analyzing algorithms and data structures, skills in substantiating the correctness of algorithms for their practical implementation, as well as theoretical and experimental assessment of their time complexity. |
| **Summary of the academic discipline:****Introduction to algorithms and data structures.** Basic concepts and definitions of algorithms and data structures. Analysis of algorithms. Complexity of algorithms and time estimates. Theory of computational complexity, complexity classes of problems. **Linear dynamic data structures** Unidirectional linked list. Bidirectional linked list. Queue. Stack. Infix, prefix, postfix expressions. **Basic search and sorting algorithms.** Basic sorting algorithms. External and internal sorting. Search algorithms. **Data hashing.** Open hashing method. Closed hashing method. **Nonlinear dynamic data structures.** Tree. Binary search tree. AVL tree. Red-black trees. **Data compression algorithms.** Huffman algorithm. RLE algorithm. LZ\* algorithms. **Graphs.** Methods of representing oriented graphs. Algorithms for finding the shortest paths on an oriented graph. Graph traversals. **Data structures for external memory.** Data organization on devices with direct and sequential access. |