# Syllabus of the educational discipline «Algorithms and Data Structures»

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| **Specialty** | *121 Software engineering* |
| **Study program** | *All educational programs* |
| **Level of education** | *First (bachelor) level* |
| **Discipline status** | *Mandatory* |
| **Teaching language** | *English* |
| **Course / semester** | *2 course, 1 semester* |
| **Number of credits ECTS** | *5,5* |
| **Workload** | *Lectures – 24 hours.* |
| | *Practical studies (seminars) – 14 hours.* |
| | *Laboratory stusies – 34 hours.* |
| | *Self-study – 108 hours.* |
| **Assessment system** | *Grading / Grading including exam* |
| **Department** | *Information Systems, 61166,Kharkiv, Nauky av., 9a, S Kuznets Khneu, 412, 413., http://www.is.hneu.edu.ua/* |
| **Teaching staff** | *Liudmyla Eduardivna Gryzun, Doctoral Degree in Pedagogical Science, Professor, Full Professor* |
| **Contacts** | *Liudmyla Gryzun, Lgr2007@ukr.net* |
| **Course schedule** | *Lectures: according to the schedule*<br>*Practical studies: according to the schedule* |
| **Consultations** | *Online consultations via* PNS chat. |

**Learning objectives and skills:**

to provide students' understanding of efficient algorithms, methods of their investigation and analysis as well as students' skills of basic algorithms developing.

**Prerequisites for learning**

The list of the preliminary learnt disciplines: Programming, Fundamentals of Algorithmization, Higher Mathematics.

**Structural and logical scheme of the course**

| Prerequisites | Postrequsites |
|---|---|
| Programming | Object-oriented programming |
| Basics of algorithmisation | Web-programming |
| Discrete mathematics | Software quality and testing |
| Higher Mathematics | Distributed and parallel computing |
| | Software engineering |

**Content of the educational discipline**

**Content module 1:** *Algorithm concept and algorithmic strategies*

**Topic 1. Algorithm concept. Basic properties of algorithms.**
**Topic 2. Algorithms for work with integers**
**Topic 3. Search and sorting algorithms**
**Content module 2:** *Fundamental data processing algorithms*
**Topic 4. Basic data structures. Features and implementation**
**Topic 5. Fundamental algorithms on graphs**
**Topic 6. Combinatorial and recursive algorithms**

**Teaching environment (software)**

*Multimedia projector, S. Kuznets PNS, Corporate Zoom system*

**Assessment system**

The system of assessment of formed students' competencies takes into account the types of classes, which according to the curriculum of the discipline include lectures, laboratory classes, as well as independent work. Assessment of the formed competencies of students is carried out according to the accumulative 100-point system. Control measures include: current control, which is carried out for the semester during lectures, laboratory classes and is estimated by the amount of points scored. Maximum amount for current control is 60 points, the minimum amount that allows a student to take the exam is 35 points. Maximum grades for the exam are 40 points, minimum grades are 25.

The procedure for conducting current assessment of students' knowledge include: the tasks doing at the laboratory classes, presentations and test papers.

More detailed information on assessment is given in the technological card of the discipline.

***More detailed information on assessment and grading system is given in the technological card of the course.***

**Discipline policies**

*Policy of academic integrity is kept during the course studying. Students have to attend lectures and laboratory classes on the discipline. If there are proper reasons, they have to inform the teacher of their absence. Regular studying of lecture material and doing laboratory tasks due to deadlines are obligatory. The tasks of independent work are to be passed in the established terms. The presence of students at the modular and final tests is mandatory.*