Syllabus of the educational discipline
«LEARNING PRACTICE ON PROGRAMMING»

Cycle of Higher Education	*First cycle of higher education (Bachelor's degree)*
Field of Study	*F Information Technologies*
Specialty	*F7 Computer engineering*
Educational program	*Computer systems and networks*
Discipline status	*Normative*
Teaching language	*English*
Year of studies, semester	*1 year (2 semester)*
Number of credits ECTS	*3 credits*
Distribution by types of trainings and hours of study	*Individual work under the guidance of a teacher, Independent training*
Form of final assessment	*Test*
Teacher	*Korol Yu. Yu., Associate Professor of the Department of Computer systems and networks, PhD* *Syniavska O. O., Associate professor of Department of Probability Theory and Mathematical Analysis, PhD*
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Course Schedule	*According to the timetable*

The purpose of the discipline " Learning Practice on Programming " – consolidation of theoretical and knowledge gained by students in the study of courses "Programming", "Data structures and algorithms", "Information theory and coding" taking into account the specifics of the bases, gaining practical skills and abilities to solve current professional problems in the field of computer engineering; deepening and consolidation of theoretical knowledge and practical skills; professional and general cultural competencies; performance of an individual task.

It aims at:

acquainting with key programming languages and environments and their practical use;

acquiring knowledge and skills for defining and using classes, objects, functions and templates;

compilation of programs and projects by using program libraries for working with different data types and forms for presentation of information.

During the practice the student must:

- to consolidate theoretical knowledge from the courses "Programming", "Data structures and algorithms", "Information theory and coding", as well as other special disciplines;
- get acquainted with the content of official documentation and learn to independently compile similar forms of documents;
- collect and process the necessary material for the preparation of a report on practice;
- technically competent to record the results of work, draw up a report on practice;
- draw up a "Diary" of learning practice.

Before starting the internship, each student must be instructed in occupational safety and health (introductory and in the workplace) with the appropriate documentation.

The discipline provides part of the following laboratory exercises and projects in relevant disciplines from the curriculum of the specialty on first year.

Prerequisites for learning

High School Informatics Course

Typical individual task for deepening skills in "Programming" and "Data structures and algorithms"

Topic 1. Fundamentals of dynamic programming. Resource allocation problem.

The purpose is to study the method of solving problems of dynamic programming, to consider the algorithm for solving the problem of resource allocation.

Tasks and requirements for implementation: Theoretical description of solving dynamic programming problems. Implementation of the algorithm for solving the problem of resource

allocation.
Analytical and practical research: research of methods of dynamic programming on the example of the chosen problem.
Graphic documentation: Algorithm and flowcharts.
Topic 2. Addition and multiplication of sparse matrices.
The purpose is to implement the tasks specified in the topic of actions on sparse matrices, which will be represented by arrays.
Tasks and requirements for implementation: a theoretical description of the features of representation and processing of sparse matrices. Develop procedures for the introduction of the matrix in the usual form with simultaneous representation according to a given scheme, the output of the matrix according to the scheme and in the usual form, multiplication and addition of sparse matrices. The necessary transformations must be implemented as functions.
Analytical and practical research: The effectiveness of the developed structure depending on the number of background elements. advantages and disadvantages of the chosen representation.
Special requirements: Working with matrices of large dimensions, matrix elements - real numbers.

Typical individual task for deepening skills in "Information Theory and Coding"

Calculation of information characteristics of communication channels
Develop a program that allows to solve problems Calculation work № 1.
Basic program requirements:
- input of initial data (number of alphabet characters, probabilities of alphabet characters, values of conditional probabilities) from a text file;
- checking the initial data for correctness with the output of messages in case of incorrect data;
- calculation of all values according to the appropriate formulas, checking the correctness of the results, outputting the results to a text file.

Additional features:
- batch processing of several files with initial data;
- taking into account in the data structures the sparseness of channel matrices;
- import / export of data to a text file in csv format;
- other (at the discretion of the developer).

Describe the input requirements and data structures used.

Course page on the Moodle platform (personal training system)	*Syllabuses of the educational disciplines, hyperlinks to electronic publications of the discipline, recommended literature, students' attendance, lecture materials, presentations,* **https://moodle.uzhnu.edu.ua**

Calendar plan of practice

№	Content	Deadline
1	Holding meetings with applicants, getting acquainted with the organization and timing of the internship, obtaining an individual task or group tasks.	1 day
2	Selection and analysis of information on the received tasks of practice. Choice of data structures, algorithms and programming environment.	2-4 days
3	Clarification of the problem statement and its detailing taking into account the chosen methods and means.	2-4 days
4	Software design, construction of structural diagrams and flowcharts.	3-5 days
5	Development of appropriate software, testing and analysis of results.	4-7 days
6	Diary, report and compilation	7-9 days
7	Defense of practice.	10 day
	Total duration of practice	10 days

Assessment system of learning outcomes

Current control carried out the semester and evaluated by the amount of points (max is 100 points). A minimum amount, that allows a student to get credit is 35 (max is 100 points).

The policy of deadlines and re-passing: The works that are submitted in violation of deadlines without valid reasons are graded with a lower score (-50% points).

The rating scale (R_s) for the discipline is equal to:

*R_s=20(training)+25(preparation of the report)+5(*diary*)+50 (* defense of practice*) =100 points. Final (semester) control is carried out in the form of test and evaluated in points (max is 100 points, min is 35 points).*

ECTS and national grading scale

Mark scale	ECTS	Exam	Test
90 - 100	A	Excellent	Satisfied
82 - 89	B	Good	
74 - 81	C		
64 - 73	D	Satisfactory	
60 - 63	E		
35 - 59	FX	"Unsatisfactory" with possibility to pass the exam again	"Not satisfied" with possibility to pass the exam again
1 - 34	F	"Unsatisfactory" with obligatory repeated study of the discipline	"Not satisfied" with obligatory repeated study of the discipline