



SYLLABUS OF THE EDUCATIONAL DISCIPLINE

«Object-oriented programming»

A component of the educational program – *mandatory* (5 credits)

Educational and professional program	Programming technologies and computer modeling
Specialty	F1 Applied Mathematics
Discipline	F Information Technology
Level of higher education	the first bachelor's degree
Language of education	Ukrainian, English
Teacher profile(s)	Tetyana Mykolayivna Sopronyuk, candidate physics and mathematics of Sciences, associate professor of the Department of PMIT https://amit.chnu.edu.ua/pro-kafedru/personalii/soproniuk-tetiana-mykolaivna/
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Course page in Moodle	https://moodle.chnu.edu.ua/course/view.php?id=1901
Consultations	According to the consultation schedule

ABSTRACT OF THE EDUCATIONAL DISCIPLINE

The discipline "Object-oriented programming" is a mandatory discipline from specialty F1 "Applied mathematics" for the educational program "Programming technologies and computer modeling", which is taught in the III semester in the amount of 5 credits (according to the ECTS European Credit Transfer System).

The course is dedicated to the study of modern C++ programming technologies (procedural, modular and object-oriented programming paradigms) using classes, inheritance and polymorphism. The course demonstrates the application of an object-oriented approach to software development.

The goal of the educational discipline: in-depth mastering of modern C++ programming technologies using classes, inheritance and polymorphism. To achieve the goal, students must master the program material, write programs, complete modular tests, and pass an exam.

EDUCATIONAL CONTENT OF THE EDUCATIONAL COMPONENT

MODULE 1. New opportunities S ⁺⁺ , which are not related to OOP	
Topic 1	Programming paradigm. Procedural, modular and object-oriented programming
Topic 2	Classless C++ enhancements
MODULE 2. Encapsulation. The concept of class	
Topic 3	Classes and objects. Creation and destruction of objects
Topic 4	Operations on class objects
MODULE 3. Inheritance and polymorphism	
Topic 5	Inheritance. Hierarchy of classes
Topic 6	Polymorphism. Virtual functions.

Topic 7	Libraries of C++ classes and templates
Topic 8	Exceptions
Topic 9	Work with data streams (Sstream)

FORMS, METHODS AND EDUCATIONAL TECHNOLOGIES OF LEARNING

1. Forms of education:

- ☐ **Traditional lectures:** Teaching theoretical material with an emphasis on key concepts of C++ programming. Use of multimedia presentations, live coding and demos.
- ☐ **Laboratory work:** Classes where students implement specific tasks that reflect real problems.

2. Teaching methods:

- ☐ **Active learning:** Use of methods of active involvement of students through questions, discussions and interactive exercises during lectures and laboratory sessions.
- ☐ **Reflective learning:** Students keep electronic notebooks (reports of what they have done in laboratory classes).

3. Educational technologies:

- ☐ **Virtual learning environments:** Using the Moodle platform, where you can organize course materials, conduct discussions, set and evaluate tasks.
- ☐ **Integrated Development Environments (IDE):** Using professional tools like Visual Studio, CLion, Code::Blocks which are standard for C++ development.

FORMS AND METHODS OF CONTROL AND EVALUATION

Current control: control module testing, evaluation of laboratory work.

Final control – exam.

CRITERIA FOR ASSESSMENT OF LEARNING RESULTS

The evaluation of the program results of the training of education seekers is carried out according to the scale of the European credit and transfer system (ECTS).

The criterion for successful evaluation is the achievement by the student of higher education of the minimum threshold levels (points) for each planned learning outcome.

ACADEMIC INTEGRITY POLICY

Compliance with the academic integrity policy by participants in the educational process while studying this educational component is regulated by the current documents of Chernivtsi National University:

- "Code of Academic Integrity and Ethics of Yuriy Fedkovych Chernivtsi National University"
<https://www.chnu.edu.ua/universytet/normatyvni-dokumenty/kodeks-akademichnoi-dobrochesnosti-ta-etyky-chernivetskoho-natsionalnoho-universytetu-imeni-yurii-fedkovycha/>
- "Regulations on the Detection and Prevention of Academic Plagiarism at Yuriy Fedkovych Chernivtsi National University"

<https://www.chnu.edu.ua/universytet/normatyvni-dokumenty/polozhennia-pro-vyiavlennia-ta-zapobihannia-akademichnomu-plahiatu-u-chernivetskomu-natsionalnomu-universyteti-imeni-yurii-fedkovycha/>

- "Policy on the Use of Artificial Intelligence at Yuriy Fedkovych Chernivtsi National University"

<https://www.chnu.edu.ua/universytet/normatyvni-dokumenty/polityka-vykorystannia-shtuchoho-intelektu-v-chernivetskomu-natsionalnomu-universyteti-imeni-yurii-fedkovycha/>

USE OF ARTIFICIAL INTELLIGENCE (AI) TOOLS BY STUDENTS DURING ACADEMIC TASKS:

- Permitted provided that the principles of academic integrity are observed (the student bears full responsibility for the content, accuracy, and results of the submitted work, and if AI is used, they are obliged to indicate the fact and the method of its application);
- Not permitted as a replacement for independent completion of tasks or for the purpose of violating academic integrity requirements;
- Additional restrictions or requirements regarding the use of AI may be determined by the instructor within the educational process for specific types of academic activities, depending on the particular features of the discipline.

INFORMATION RESOURCES

1. Yaroshko S.A. Algorithm development methods. Programming in the C++ language: A study guide / S.A. Yaroshko, O.S. Yaroshko - Lviv: LNU named after Ivan Franko, 2022. - 248 p. [electronic version: <https://lnuittutor.github.io/>]
2. Online compiler and debugger for c/c++ [Electronic resource] Access mode: <https://www.onlinegdb.com>
3. C++ reference [Electronic resource]. Access mode: <https://en.cppreference.com/w>
4. Learn C++ [Electronic resource]. Access mode: <https://www.learncpp.com/>
5. C++ Stories Stay up-to-date with Modern C++ [Electronic resource]. Access mode: <https://www.cppstories.com/>

Detailed information on studying the course "Object-oriented programming" covered in the work program of the academic discipline

https://media.chnu.edu.ua/media/mn2ngbq4/ok10-ob-iektno-orientovane-prohramuvannia_pm.pdf