COURSE SYLLABUS
"OBJECT-ORIENTED PROGRAMMING"

Educational Program Component –
compulsory (5 *credits*)

Educational and Professional Program	Programming Technologies and Computer Modeling
Specialty	F1 – Applied Mathematics
Field of Study	F – Information Technologies
Level of Higher Education	First (Bachelor's)
Language of Instruction	English, Ukrainian
Instructor Profile	Tetyana Mykolaivna Sopronyuk – PhD in Physics and Mathematics, Associate Professor, Associate Professor of the Department of Applied Mathematics and Information Technologies https://amit.chnu.edu.ua/pro-kafedru/personalii/soproniuk-tetiana-mykolaivna/
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Moodle Course Page	https://moodle.chnu.edu.ua/course/view.php?id=1901
Consultations	Wednesday, 18:00–19:00

COURSE DESCRIPTION

The course "Object-Oriented Programming" is a compulsory course in Specialty F1 "Applied Mathematics" for the Educational and Professional Program "Programming Technologies and Computer Modeling", taught in the 3rd semester with a workload of 5 ECTS credits (European Credit Transfer and Accumulation System).

The course is devoted to studying modern C++ programming technologies (procedural, modular, and object-oriented programming paradigms) using classes, inheritance, and polymorphism. It demonstrates the application of the object-oriented approach to software development. The aim of the course is to provide in-depth mastery of modern C++ programming techniques using classes, inheritance, and polymorphism. To achieve this goal, students must master the course material, write programs, complete module tests, and pass the final exam.

To effectively master the course, students should have foundational knowledge of algorithmization and procedural programming in C/C++.

COURSE CONTENT

MODULE 1. New C++ Features Not Related to OOP	
Topic 1	Programming Paradigms. Procedural, Modular, and Object-Oriented Programming.
Topic 2	Extended C++ Features Not Related to Classes.
MODULE 2. Encapsulation. The Concept of a 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. Class Hierarchy.
Topic 6	Polymorphism. Virtual Functions.
Topic 7	C++ Class and Template Libraries.
Topic 8	Exceptions (Exception Handling).
Topic 9	Working with Data Streams (Stream).

FORMS, METHODS, AND EDUCATIONAL TECHNOLOGIES OF TEACHING

The teaching process employs verbal and visual classical and digital methods (explanatory and illustrative lectures using multimedia presentations, live code walkthroughs in an IDE), practice-oriented laboratory sessions, active and reflective learning methods (maintaining electronic laboratory reports), as well as e-learning in LMS Moodle using Google Meet for video conferences and online consultations (in case of distance or blended learning). Professional integrated development environments (Visual Studio, CLion, Code::Blocks) are used during laboratory classes.

FORMS AND METHODS OF CONTROL AND ASSESSMENT

Continuous Assessment: module tests, completion and defense of laboratory works.

Final Assessment: semester exam (together with continuous and module assessment – up to 100 points).

Students have the right to recognition of learning outcomes acquired through non-formal/informal education (online courses, certificates). The procedure and conditions for credit transfer of individual topics or the course are fully regulated by the current Regulations of Yuriy Fedkovych Chernivtsi National University and outlined in the Course Work Program.

ASSESSMENT CRITERIA FOR LEARNING OUTCOMES

Students' program learning outcomes are assessed on a 100-point cumulative scale with subsequent conversion into the national grading scale and the European Credit Transfer and Accumulation System (ECTS) scale. The criterion for successful assessment is the achievement of 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 the educational component is regulated by the current documents of Yuriy Fedkovych 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-yuriia-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-yuriia-fedkovycha/
- “Policy on the Use of Artificial Intelligence at Yuriy Fedkovych Chernivtsi National University”
https://www.chnu.edu.ua/universytet/normatyvni-dokumenty/polityka-vykorystannia-shtuchnoho-intelektu-v-chernivetskomu-natsionalnomu-universyteti-imeni-yuriia-fedkovycha/

USE OF ARTIFICIAL INTELLIGENCE (AI) TOOLS BY STUDENTS WHEN COMPLETING COURSEWORK:

- *is permitted provided* compliance with the principles of academic integrity (the student is responsible for the content, reliability, and results of the submitted work, and if AI is used, must indicate the fact and method of its application);
- *is prohibited* to use AI as a substitute for independent completion of assignments or in order to violate academic integrity requirements;
- *additional restrictions or requirements* regarding the use of AI may be determined by the instructor in the educational process for specific types of learning activities in accordance with the specifics of the course.

INFORMATION RESOURCES

1. *Electronic course “Object-Oriented Programming” in LMS Moodle of ChNU:*
https://moodle.chnu.edu.ua/course/view.php?id=1901
2. *Open Educational Resource on C++ Programming:*
Ghunaim H. Introduction to C++. Volume I : open educational resource. Fort Hays State University, 2025. DOI: 10.58809/FNWV7666.
https://fhsu.pressbooks.pub/IntroductionToCPlusPlusVolumeI/
3. *Online Guide to Modern C++ (Learn C++):*
https://www.learncpp.com/
4. *Online Resource on Modern C++ Standards (C++ Stories):*
https://www.cppstories.com/
5. *Open Textbook on Object-Oriented Programming in C++:*
Khufu: Object-Oriented Programming Using C++ : open textbook. University of Toronto, 2025.
https://www.eecg.utoronto.ca/~salma/projects/textbooks/

Detailed information on studying the course “Object-Oriented Programming” is provided in the course work program