

University American College Skopje
School of Computer Science and Information Technology

Academic year: 2024/25 Version: 20.01.2025

Course: Object Programming
Year: I
Prerequisites: Fundamentals of Programming
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Course duration: Theory 30 hours + Practical 30 hours
Credit hours : 6 ECTS
Room: Computer laboratory
Meeting hours: TBA

Required text:

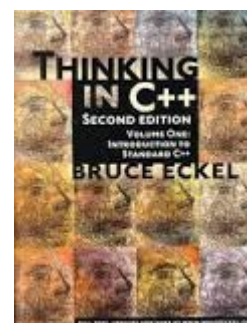
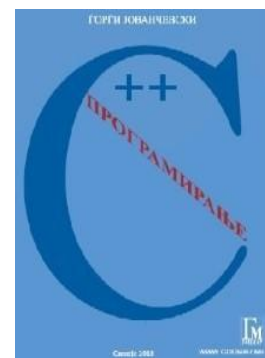
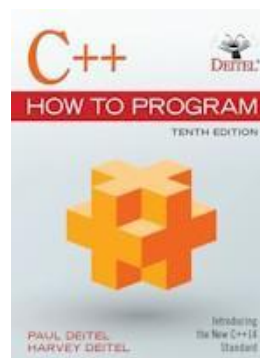
Paul Deitel, Harvey Deitel
C++ How to Program,
Tenth Edition, 2016
Pub: Pearson Education, Inc.
ISBN-13: 978-0134448237
ISBN-10: 0134448235

Gjorgji Jovančevski
C++ Programming
ISBN-10: 9989-684-64-7
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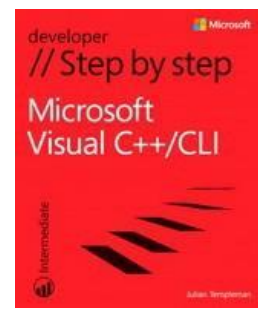
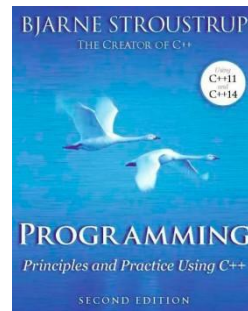
Julian Templeman
Microsoft Visual C++/CLI Step by Step
O'Reilly Media, Inc. 2013
ISBN: 978-0-7356-7517-9
eBook 978-0-7356-7514-8

Supplementary reading:

Bjarne Stroustrup
Programming: Principles and Practice
Using C++, 2nd Edition, 2014
Pub: Pearson Education, Inc.
ISBN-13: 978-0321992789
ISBN-10: 0321992784



Eckel,B., Allison.C.:
Thinking in C++: Practical
Programming, Vol.2, Pub: Prentice Hall,
2003



Course outline

This course will teach you the fundamentals of Object Oriented Programming (OOP) using the C++ programming language. You will learn the concepts of Object Oriented Programming, such as: objects, abstraction, classes, hierarchy modularity and encapsulation, inheritance, polymorphism and operator overloading, through C++ programming exercises. By taking this course you will also:

- ☐ Understand the concepts of object-oriented programming
- ☐ Understand encapsulation
- ☐ Understand extensibility
- ☐ Understand software reusability
- ☐ Understand how to use class libraries
- ☐ Write *in-line* functions
- ☐ Use reference parameters
- ☐ Perform dynamic memory allocation with *new* and *delete*
- ☐ Use default function arguments
- ☐ Build abstract data types using classes
- ☐ Understand and use constructor and destructor functions to initialize and destroy class objects
- ☐ Use the *const* qualifier to create constant objects and constant member functions
- ☐ Create *static* data members and *static* member functions
- ☐ Use *friend* functions and *friend* classes
- ☐ Overload functions
- ☐ Overload operators to work with user-defined classes
- ☐ Use inheritance to build class hierarchies
- ☐ Understand and use polymorphism and virtual functions

Learning objectives

After completion of this course, the student will be able to:

- Demonstrate use of advanced programming statements and be able to use these statements in writing a large program.
- Demonstrate knowledge of data abstraction, specification, refinement and implementation.
- Demonstrate use of OOP concepts like encapsulation, inheritance, polymorphism.
- To get familiar with elements of OOP using C++.
- Acquiring the philosophy necessary for satisfying programming needs of other people, critical thinking and cooperation.

Lectures and exercises

The course will be conducted through lectures and laboratory exercises. The lectures will present the concepts, procedures and techniques of programming and their implementation will be exercised at the computer laboratory exercises. Besides the mandatory laboratory exercises, students will get homework assignments.

Course delivery

Key concepts from the recommended textbook will be reviewed in the class lecture, which will primarily take the form of PowerPoint slideshows with pre-programmed examples. Students will receive notes or outlines for every lecture, which should help them use the material. At the conclusion of lectures, there will be quizzes, and during exercises, there will be in-class projects. There will also be homework assigned. Students can offer ideas regarding how courses should be designed. Submission and presentation of the final product/project are anticipated.

Intended learning outcomes

1. Knowledge and Understanding:

By the end of this course, students will have a solid foundation in object-oriented programming (OOP) concepts, understanding key concepts of basic programming constructs, like loops, conditionals, and functions. They will learn to translate real-world problems into structured steps and apply these steps to create functional algorithms. Additionally, students will develop a deep understanding of fundamental programming concepts, such as data types, control structures, and the basic operations that form the backbone of programming languages, like C++. Also, they will implement the OOP concepts, such as: encapsulation, inheritance, polymorphism, etc.

2. Applying Knowledge and Understanding:

Students will apply the knowledge gained in class through hands-on exercises and practical assignments. They will practice developing algorithms into C++ programs. By engaging with real-world scenarios, students will enhance their problem-solving skills, implementing algorithms to tackle searching, sorting, and other tasks. Practical applications will be demonstrated through software tools, such as Visual Studio Code, further refining their programming capabilities.

3. Making Judgements:

Throughout the course, students will be encouraged to critically evaluate their approach to solving programming tasks. They will make informed decisions about the most efficient algorithmic methods for given problems, considering factors such as: time and space complexity, optimization, and functionality. By analysing different strategies, they will be able to assess their solutions' accuracy, efficiency, and scalability, developing their ability to choose the best algorithmic and coding practices for various contexts.

4. Communication Skills:

Students will enhance their communication skills through both written and verbal formats. They will present their understanding of code reusability, algorithms, and programming concepts in a clear, structured manner. Group projects will offer opportunities for collaboration, where students will articulate their ideas and findings. Presenting their project outcomes at the end of the course will allow them to refine their ability to explain technical concepts in an accessible way, promoting effective communication within team environments.

5. Learning Skills:

The course will foster independent learning skills, as students will engage in self-guided practice through homework and project-based tasks. By navigating software tools, solving problems, and exploring various algorithms, students will build a robust framework for lifelong learning in OOP. The inclusion of quizzes will motivate students to take initiative in their learning, enhancing their ability to adapt and acquire new skills throughout their OOP journey.

Instructor's expectations from students

- Attend class regularly and take instructor's notes which can be used as a guideline.
- Contribute to the interactive aspects of classes.

- Prepare and follow your own program for home reading and work (programming the assignments).
- Avoid anti-social behavior in the University and anti-academic behavior in the classroom (i.e. plagiarism, cheating, etc.)
- Try to interconnect the material taught on related subjects,
- Impose a self-discipline regarding University rules and procedures.

Weekly delivery plan:

Class	Date	Theme
1.		Introduction to the Course
2.		Classes, Objects and Class Members
3.		Constructors, Access Modifiers, Get and Set Methods
4.		Constructor Overloading, Pointer Access, Destructors
5.		Dynamic Memory Allocation, Composition, Friends, The this Pointer, Static Members
6.		Trial Mid-Term Exam
7.		Mid-Term Exam
8.		Separating Interface from Implementation, Advanced Overloading
9.		Operator Overloading
10.		Inheritance, Protected Members, Derived Classes
11.		Virtual Functions. Polymorphism
12.		Exception Handling
13.		Project Presentations
14.		Trial Final Exam
15.		Reading week
16.		Final Exam

Evaluation structure and assessments during teaching semester:

- Attendance criteria:
 - Up to 25% absences (4 of 15) – can get points and be evaluated;
 - 25-50% absences (5 - 7 of 15) - no points from attendance (0% attendance evaluation) but will be allowed to take exams;
 - More than 50% absence (8 and above) - is not allowed to take the Final-Term Exam, in a sense, it will not be possible to come to the Final-Term Exam and to be graded if minimum criteria are not met.
 - In this case, the student must come directly to the MakeUp Exam at the end of the semester.
- Exams criteria:
 - Minimum requirements of 20% of the Mid-Term Exam (20 of 100 points) are necessary for the student to be eligible in taking the Final-Term Exam.
 - Minimum requirements of 20% of the Final-Term Exam (20 of 100 points) are necessary for the student to be eligible for final Evaluation and making of the final grade.
 - In a sense, it will not be possible to take the Final-Term Exam and to be graded if minimum criteria from both attendance and exam are not met.
 - In this case, the student must come directly to the MakeUp Exam at the end of the semester.
- Regular participation and activity with attendance: 20%, of which:
 - Attendance on classes: 10%
 - Active participation on quizzes: 10%
- Mid-Term Exam: 30% of 100 points gathered below, of which it will include:
 - Theory Quiz from the Lectures done via SEB (Safe Exam Browser)
 - 40 points of 100
 - Practical Questions Quiz from the Exercises done via SEB
 - 20 points of 100

- Practical Assignments (one simple assignment, and the second more complex assignment on a computer device in a corresponding software from the exercises).
 - 40 points of 100
 - Important Note: To avoid cheating and misuse of various AI tools, the second assignment will not be evaluated if the first assignment is not completed or not correct as it is the initial evaluation of the student to recognize that he/she understands the materials.
 - Exams quizzes, both for theory and practical, consist of questions similar to the questions from the active participation quizzes done after each lecture and exercise.
 - The Exam Practical Assignments consist of similar practice assignments done on each of the exercises and from the homework practice assignments.
 - Total:
 - Theory Quiz (40 points) + Practical Questions Quiz (20 points) + Practical Assignments (40 points) = 100 points
- Final-Term Exam: **30%** of 100 points gathered below, of which it will include:
 - Theory Quiz from the Lectures done via SEB (Safe Exam Browser)
 - 40 points of 100
 - Practical Questions Quiz from the Exercises done via SEB
 - 20 points of 100
 - Practical Assignments (one simple assignment, and the second more complex assignment on a computer device in a corresponding software from the exercises).
 - 40 points of 100
 - Important Note: To avoid cheating and misuse of various AI tools, the second assignment will not be evaluated if the first assignment is not completed or not correct as it is the initial evaluation of the student to recognize that he/she understands the materials.
 - Exams quizzes, both for theory and practical, consist of questions similar to the questions from the active participation quizzes done after each lecture and exercise.
 - The Exam Practical Assignments consist of similar practice assignments done on each of the exercises and from the homework practice assignments.
 - Total:
 - Theory Quiz (40 points) + Practical Questions Quiz (20 points) + Practical Assignments (40 points) = 100 points
 - Semester Course Project: - **20%** of 100 points gathered below, of which it will include:
 - With group preparation of the seminar tasks (students will be divided in groups according to the professor), students will prepare their project assignment by submitting a documentation of the solved project assignment and PowerPoint presentation in which all of the group members need to orally present their participation and work in the project.
 - Project Submission: 10% (50 points)
 - Oral Presentation: 10% (50 points)
 - Important Note: Oral presentation of the project is mandatory in order to be included for evaluation.
 - Total:
 - Project Submission (10% - 50 points) + Oral Presentation (10% - 50 points) = 20% (100 points)
 - Assessment structure for the course:

○ <i>Assignments</i>	<i>% of total Grade</i>
○ Class Presence	10%
○ Active Participation (Quizzes)	10%
○ Project or Assignment	20%
○ Midterm Exam	30%
○ Final Exam	30%
○	
○ <u>Total:</u>	<u>100%</u>

Evaluation structure and assessments for MakeUp examinations

- **MakeUp Exam: 100%**, of which it will include:
 - Theory Quiz from the Lectures done via SEB (Safe Exam Browser)
 - 40%
 - Practical Questions Quiz from the Exercises done via SEB
 - 20%
 - Practical Assignments (one small simple assignment on pencil and paper, and the second more complex assignment on a computer device in a corresponding software from the exercises).
 - 40%
 - **Important Note:** To avoid cheating and misuse of various AI tools, the second assignment will not be evaluated if the first assignment is not completed or not correct as it is the initial evaluation of the student to recognize that he/she understands the materials.
 - Exams quizzes, both for theory and practical, consist of questions similar to the questions from the active participation quizzes done after each lecture and exercise.
 - The Exam Practical Assignments consist of similar practice assignments done on each of the exercises and from the homework practice assignments.
- **Total:**
 - Theory Quiz (40%) + Practical Questions Quiz (20%) + Practical Assignments (40%) = 100%

Evaluation structure and assessments for Part-Time Student examinations:

- **Exam: 100%**, of which it will include:
 - Theory Quiz from the Lectures done via SEB (Safe Exam Browser)
 - 40%
 - Practical Questions Quiz from the Exercises done via SEB
 - 20%
 - Practical Assignments (one small simple assignment on pencil and paper, and the second more complex assignment on a computer device in a corresponding software from the exercises).
 - 40%
 - **Important Note:** To avoid cheating and misuse of various AI tools, the second assignment will not be evaluated if the first assignment is not completed or not correct as it is the initial evaluation of the student to recognize that he/she understands the materials.
 - Exams quizzes, both for theory and practical, consist of questions similar to the questions from the active participation quizzes done after each lecture and exercise.
 - The Exam Practical Assignments consist of similar practice assignments done on each of the exercises and from the homework practice assignments.
- **Total:**
 - Theory Quiz (40%) + Practical Questions Quiz (20%) + Practical Assignments (40%) = 100%

Exams are closed books. Also, you use your own calculator, pencil, and empty paper signed by the professor, and nothing else will be allowed.

Mobile phones are strictly not tolerated in the class for any use (including computations). Active participation is meant as the effort and the interest that a student shows in the class, including homework.

Make-up tests are given in exceptional circumstances. Cheating and plagiarism in any form will result immediately in the grade F. I assign a grade of (incomplete) only when a student misses the Midterm or the Final exam due to a **College-excused absence**, and is unable to make up before final grades are due to the Record's Office. Please, consider seriously that there will be no exceptions concerning the above policy.

Class Conduct : You are responsible for everything that is announced, presented or discussed in class. The way to avoid any misunderstanding associated with this course is to attend class. You are expected to attend class and attendance records are kept.

Please, refrain from talking during class, it is disruptive to your colleagues and the lecture. Give only your best behaviour in class. This is what education is all about. If you have a question about the material, please don't hesitate to ask; if you are lost or confused, your question may help clarify the topic. Please, consider that **the language of instruction is English, so all our conversation into the class must be in this language.**

Keep in mind the following :

C- or better is required to use a course either as a prerequisite or as a major requirement.

G.P.A. (Grade Point Average): is computed for each student using the quality points earned for each course taken. A G.P.A. of at least 1.67 is required for transfer and to graduate from ACS.

I wish you an interesting and creative academic semester.

Evaluation		
Mark	%	Average
A	96-100	4.00
A-	90-95	3.67
B+	87-89	3.33
B	83-86	3.00
B-	80-82	2.67
C+	77-79	2.33
C	73-76	2.00
C-	70-72	1.67
D+	67-69	1.33
D	63-66	1.00
D-	60-62	0.67
F	0 -59	0.00

Academic Honesty:

Academic honesty is a core value that safeguards the reputation of University American College Skopje and its faculty, staff, and students.

All UACS members are expected to conduct themselves in an honest manner observing the University Code of Ethics.

Plagiarism, cheating, multiple submissions, falsification of data, and unauthorised assistance are considered as serious offences and may result in grade F (fail) on the exam, project, and course, and/or lead to further sanctions, including expulsion from the University.

Any work that is submitted at any stage must be your own. Any words, ideas, or data borrowed from other sources must be properly credited and documented.

You may not use generative AI tools, such as ChatGPT, while completing any assignment, unless explicitly permitted by the course instructor in specific contexts. However, you may use generative AI for self-learning purposes on assignments and exercises only if instructed by the course instructor for exercises and home learning. Any use of generative AI tools outside of these parameters constitutes plagiarism and will be sanctioned accordingly.

Late Work

Many reasons are given for late work (e.g., flat tires, printer problems, illness, oversleeping, etc.). No matter what the reason, the bottom line is that either (a) the work was completed and turned in when required or (b) the assignment was not completed and turned in when required.

As specified earlier, assignments are due in class at the beginning of class on the specified due date. There is NO PROVISION for late work on any assignment (i.e., late work is not accepted). I also strongly recommend having backup systems in place so that you can have all work completed on schedule. Having your work completed on schedule is a key to early success in your business career. NOTE: Late submissions are not accepted. Partial credit will NOT be given for late work.

Prepared by:

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