Study programme(s): Applied mathematics (MB)

Level: master

Course title: Advanced programming for mathematicians (MB-16)

Lecturer: Srđan M. Škrbić

Status: elective

ECTS: 7

Requirements: none

Learning objectives

This is an introductory course for C++. It is intended for students of mathematics with little programming experience. The goal is to study the main constructions of C++, including object-oriented programming and to gain basic knowledge of the use of this programming language for scientific purposes.

Learning outcomes

Minimal: At the end of the course, it is expected that students understand the basic concepts of the C++ language, including object-oriented programming. It is also expected that students know how to apply this knowledge in practical programming and science.

Desirable: At the end of the course, it is expected that a successful student shows ability to identify optimal ways to solve a specific given problem using C++. It is also expected that a successful student has active knowledge of all advanced concepts of this language.

Syllabus

Theoretical instruction

At the beginning of the course, an introduction to basic constructions of C++ is given – program structure, data types, constants, operators and flow control. In the continuation, functions, arrays, strings and pointers are presented. The second part of the course is an introduction to object-oriented programming using C++.

Practical instruction

Exercises serve for practising the concepts covered by lectures through examples motivated by science applications. The accent is on use of object-oriented programming and its applications in science.

Literature

1. Bjarne Stroustrup, The C++ Programming Language, Addison-Wesley, 2000.
2. Scott Meyers,Effective C++, Addison-Wesley, 2005.
3. Bruce Eckel, Thinking in C++, Prentice Hall, 2000.
4. William Press, Saul Teukolsky, William Vetterling, Brian Flannery, Numerical Recipes: The Art of Scientific Computing, Third Edition in C++, 2007.

Weekly teaching load				Other:
Lectures: 3	Exercises: 3	Other forms of teaching:	Student research:	

Teaching methodology

In theoretical classes, classical methods of teaching together with a projector are used to present the stated topics. On practical classes, classical methods of teaching together with a projector and computers with the appropriate software installed, are used to practically master the skills of application of the suggested tools. Precondition for successful practical classes is the existence of a sufficient number of computers enabling every student to perform individual work.

Grading (maximum number of points 100)

Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia	50	Oral exam	50