Program	Level	First cycle
	Name of the program	Theoretical Computer Science, Applied Mathematics, Mathematics and Informatics Education

COURSE

Course title	**Programming II**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
CS160	II	Mandatory course	6	3+2+2
Lecturer				

Course Goals	This course is designed to teach students advanced C++ constructs and the usage of the object-oriented methodology for writing useful C++ programs. Additionally, this course aims to help students to 1. Develop and implement correct and efficient programs using the C++ language; 2. Define, compare, and contrast the fundamental concepts of object-oriented programming: data abstraction, encapsulation, inheritance, and polymorphism; 3. Design algorithms according to object-oriented concepts; 4. Design and develop classes that implement data abstraction, encapsulation, inheritance, and polymorphism concepts.
Learning Outcomes	By the end of the course, the students will be able to: • Understand the basic concepts of object-oriented programming such as data abstraction, encapsulation, inheritance, and polymorphism; • Implement abstract data types (ADT) by using classes; • Understand the concepts of generic data types; • Designing a modular software system by using object-oriented methods; • Systematically perform the testing of programs as well as systems.

COURSE CONTENT

- Types and Declarations.Pointers, Arrays and References. Structures. Unions and Enumerations.
- Statements. Expressions. Select Operations.Functions. Exception Handling. Namespaces.
- Classes. Construction. Cleanup. Copy and Move. Overloading. Special Operators. Derived Classes.
- Run-Time Type Information. Templates. Generic Programming. Specialization. Instantiation.
- Templates and Hierarchies. Metaprogramming. A Matrix Desing.
- STL Containers. STL Algorithms. STL Iterators. Memory and Resources.
- Utilities. Strings. Regular Expression. I/O Streams. Locales. Numerics. Concurrency. Thread and Tasks.

LITERATURE

[1] W. Sawitch,Absolute C++, 5th Ed., 2013.
[2] M. Weisfeld, The Object-OrientedThoughtProcess, 4th Ed., 2013.
[3] R. Lafore, Object-Oriented Programming in C++ 4th Ed.", 2001.
[4] B. Stroustrup, The C++ programming language, 2013.

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Exercises	60	Individual work	45	T o t a l	150

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Laboratory assignments	25		
Exams during semester	30		
Project	10		
Final exam	35		
T o t a l	100	55	