Program	Level	Third cycle
	Name of the program	SEE Doctoral Studies in Mathematical Science

COURSE

Course title	**Algorithms and data structures II**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
CS 605	I	**Elective course**	10	30
Lecturer				
Course Goals	The main goal of the course is to acquire knowledge about selecting adequate data structures and algorithms for a given problem setting, taking into account complexity, memory requirements, and hardware-related requirements. During the course, practical exercises are provided for each teaching unit for the student to master the skill of practical application of acquired theoretical knowledge in the chosen programming language. It is planned that ideas and concepts will be realized on personal computers in programming languages C++ or Java using the available STL classes for the given languages. Particular emphasis will be placed on the performance of structures on newly developed hardware components.			

COURSE CONTENT

1. Vector, list, stack, queue, tree in parallelization.
2. Complexity of algorithms concerning the data structure (for example, access, sorting, etc.).
3. Hashing functions.
4. Implementations in C/C++ (STL), C/Java.
5. Object-oriented programming (C++, Java).
6. Data structures and performance: complexity, memory hierarchy, cache-aware data structures.
7. Examples of codes.

LITERATURE

[1] M. T.Goodrich and R. Tamassia, Algorithm Design: Foundations, Analysis and Internet Examples, Wiley, 2003.

[2] M.T. Goodrich and R. Tamassia, Data Structures and Algorithms in Java, Wiley,4 edition, 2006.

[3] M.T. Goodrich, R. Tamassia, and D.M. Mount, Data Structures and Algorithms in C++, Wiley, 2003.

[4] J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann Publishers, 3rd edition, 2003.

[5] L. Null and J. Lobour, The Essentials of Computer Organization and Architecture, Jones and Bartlett, 2003.

[6] L. T. Yang and M. Guo,High-Perfomance Computing: Paradigm and Infrastructure, Wiley, 2005.

GRADING

Criterion		Maximum points	Minimum points
1.	Assigments	20	11
2.	Projects	40	22
3.	Final exam	40	22
Total		100	55