Program	Level	Second cycle
	Name of the program	Applied Mathematics

COURSE

Course title	**Monotone Dynamical Systems**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
AMAT 540	III	Elective course	7	3+2+0
Lecturer				
Course Goals	The course aims to acquaint the students with basic concepts from the theory of monotonic dynamical systems with particular reference to competitive mappings and their application for modeling various natural and economic processes.			
Learning Outcomes	After completion of this course the student will be able to: - understand the concept of monotone dynamical systems - understand the main mathematical concepts that lie behind many of these models.			

COURSE CONTENT

Definitions and preliminary results. The convergence criterion. The limit set dichotomy. Stability. The order interval trichotomy. Some global results. Generic convergence to equilibrium. Unstable equilibria and connecting orbits. Cooperative systems. Competition models.

LITERATURE

[1] M. W. Hirsch, H. Smith, Monotone Dynamical Systems, AMS, 2004.
[2] H. L. Smith: Monotone Dynamical Systems and introduction to the theory of competitive and cooperative systems, Math. Surveys and Monographs, 41, American Mathematical Society, Rhode Island, 1995.
[3] Xiao-Qiang Zhao, Dynamical Systems in Population Biology, CMS, 2003.

STUDENT WORKLOAD (hours in semester)

Lectures	45	Tutorial	30	Individual work	100	T o t a l	175

GRADING

Criterion	Maximum points	Minimum points
Midterm exams	50	25
Homework assignment	-	-
Project	-	-
Laboratory assignments	-	-
Final exam	50	30
T o t a l	100	55

REMARKS

Midterm exam: only once in semester (end of November or first week of December). Students altogether write 120 minutes long test. This test is evaluated by max 50 points. The minimal score of the test is 25 points.

Final exam: Students who do not reach the midterm exam minimal score must take the entire course in the final exam. In this case, the final exam is evaluated by max 100 points. The final exam's minimal score is 55 points. Students who reach the midterm exam minimal score take only the part of the final exam that is not covered by the midterm test. In this case, the final exam is evaluated by max 50 points. The minimal score is 30 points.