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

COURSE

Course title	**Monotone dynamic systems**			
Course code	Semester	Course status	ECTS	Contact hours
AMAT 620	I	Elective course	10	30
Lecturer				
Course Goals	The aim of the course is to provide students with basic knowledge from monotone dynamic systems.			

COURSE CONTENT

- Semi-flows that strictly preserve the arrangement: Definitions and basic results; Unordered omega boundary sets. Dichotomy of the boundary set; Stability in normally arranged spaces; Stability equilibrium in heavily arranged spaces. Ordinary differential equations: Quasi-monotonous conditions; Strong monotony;
- Autonomous Competitive and K-cooperative systems; Dynamics of cooperative and competitive systems;
- Differential equations with delay: Quasi-monotone condition; Strong monotony
- Monotonous mappings: Motivational examples; Definitions and basic results; Trichotomy on ordered intervals; Sub linearity and trichotomy at a conical boundary condition; Smooth strong monotone mapping; Monotone mappings in the plane.
- Semi linear parabolic equations: Parabolic systems with the monotone dynamics of Shimura Taniyama and Fermat's last theorem.

LITERATURE

[1] M.W. Hirsch, Hal Smith, Monotone maps: a review
[2] M.W. Hirsch, Hal Smith, Monotone Dynamical Systems, An Introduction to the Theory of Competitive and Cooperative Systems, 2004
[3] H. L. Smith, Invariant curves for mappings, SIAM J. Math. Anal. 17 (1986), 1053-1067.
[4] H. L. Smith, Periodic competitive differential equations and the discrete dynamics of competitive maps, J. Diff. Eqns. 64 (1986), 165-194.
[5] H. L. Smith, Periodic solutions of periodic competitive and cooperative systems, SIAM J. Math. Anal. 17 (1986), 1289-1318.
[6] S. Walcher, On cooperative systems with respect to arbitrary orderings, J. Math. Anal. Appl.263, (2001), 543-554.

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Homework	20	11	
Project	40	22	
Final exam	40	22	
T o t a l	100	55	