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

COURSE

Course title	**Integer Programming**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
AMAT 365	VI	Elective course	5	2+2+0
Lecturer				
Course Goals	The main objects considered in Integer programming are problems that can be modelled with linear programs such that some or all variables are required to be integer variables. The main goal of the course is to enable students to learn some concepts and techniques used in integer programming. Special attention is devoted to classical network problems: flow, matching, and assignment problems, as well as to general methods for solving integer programs such as branch and bound and cutting plane methods.			
Learning Outcomes	After completing this course, students should demonstrate competency in the following skills: - Understand basic terms used in Integer programming; - Be able to model some real problems as integer programs; - Understand concepts used to develop methods for solving some integer programs; - Be able to formulate and solve some classical network problems such as shortest path, maximal flow, matching, etc; - Be able to solve integer programs using branch and bound and cutting plane methods.			

COURSE CONTENT

- Integer program models.
- Optimality, relaxation, bounds.
- Totally-unimodular matrices.
- Shortest path problem.
- Maximal flow problems.
- Matching problems.
- Assignment problem.
- Branch and bound method.
- Cutting plane algorithm.

LITERATURE

[1] L. A. Wolsey: Integer Programming, John Wiley & Sons, New York, 1998.
[2] F.S.Hiller, G.J Lieberman: Introduction to Operations Research (9th ed.), McGraw-Hill, 2009.
[3] M. Bazaraa, J. Jarvis, H. Sherali: Linear Programming and Network Flows (4th edition), Wiley, New Jersey, 2009.
[4] T. Sottinen: Operations Research, 2009.

STUDENT WORKLOAD (hours in a semester)

Lectures	30	Exercises	30	Individual work	65	T o t a l	125

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exam	45	22	
Project	10		
Final exam	45	22	
T o t a l	100	55	