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

COURSE

Course title	**Algebraic number theory**			
Course code	Semester	Course status	ECTS	Contact hours
PMAT 645	I	Elective course	10	30
Lecturer				
Course Goals	The theory of numbers has always been characterized by the fact that some challenging problems whose formulation is for nonmathematicians not easy to understand, during a very long gap they resist intensive efforts to find their solution. In the process, the theory of numbers has significantly influenced and affects the development of many mathematical disciplines. Several epochal achievements over the last decades, on the one hand, as well as an unsuspected large field of application on the other hand, they have increased the interest of mathematicians in research in this area. By applying abstract algebra methods to solve the problem of number theory arises algebraic theory of numbers. The aim of the course is to give insight participants in some of the current areas of research into algebraic number theory.			

COURSE CONTENT

- Algebraic numbers and whole algebraic numbers
- Uniqueness of ideal factorization
- Group of ideal classes
- Dirichlet's theorem on the ring of units
- p-adic fields, a principle from local to global
- Dedekind's son-in-law and Hecke's L-function
- Elliptical curves over number fields
- Zeta function elliptical curves
- Birch and Swinnerton-Dyer hypothesis
- Shimura-Taniyama and Fermat's last theorem

LITERATURE

[1] H. P. F. Swinnerton-Dyer, A brief guide to algebraic number theory, London Mathematical Society, Student Texts, 50. Cambridge University Press, Cambridge, x+146 pp, 2001.

[2] J. Neukirch, Algebraic number theory, Grundlehren der Mathematischen Wissenschaften, 322. Springer-Verlag, Berlin, 1999.

[3] K. Ireland and M. Rosen, A Classical Introduction to Modern Number Theory (Corrected Second Printing), Graduate Text 84, Springer, 1993.

[4] W. Narkiewicz, Elementary and Analytic Theory of Algebraic Numbers, third edition, Springer Monographs in Mathematics, Springer-Verlag, Berlin, 2004.

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