M112	**Nonlinear diophantine equations**	L	P	S	ECTS
		2	1	0	5

Course objectives. Our intention is to introduce students with other interesting properties of integers such as their representation in the form of squares, cubes and other powers of two or more integers. Students will extend their knowledge of Pellian equations. Moreover, there will be considered other non-standard types of nonlinear diophantine equations. It will be presented criteria of existence of their integral solutions. During the lectures, everything will be confirmed by appropriate examples and exercises.

Prerequisites. Undergraduate mathematics or computer science study programme.

Course content.

1. Sums of two squares. Primitive representations. Sums of three squares. Sums of four squares. Legendre's theorem.
2. Sums of two cubes. Sums of three cubes of rationals.
3. Pellian equations. Criteria of solvability.
4. Non-standard diophantine equations of a higher degree. Mordell-Bachet's equation. Some exponential equations of a several variables.
5. Fermat last theorem.

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Classify the positive integers according to representation in the form of powers of integers.
2.	Apply just proven results in analysis of specific problems.
3.	Identify the appropriate type of the equation and apply the corresponding solving result.
4.	Interpret and use the presented results in solving of exercises.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ASSESSMENT OF THE LEARNING OUTCOMES

TEACHING ACTIVITY	ECTS	LEARNING OUTCOME **	STUDENT ACTIVITY*	EVALUATION METHOD	POINTS	
					min	max
Attending lectures and exercises	1	1-6	Lecture attendance, discussion, team work and independent work on given tasks	Attendance lists, tracking activities	0	4
Written exam (Mid-terms)	2	1-6	Prepairing for written exam	Evaluation	25	48
Final exam	2	1-6	Repetition of the subject matter	Oral exam	25	48
TOTAL	5				50	100

Teaching methods and knowledge assessment. Lectures and exercises are obligatory. The exam consists of a written and oral part. After the completion of lectures and exercises students can take the exam. Acceptable mid-term exam scores replace the written examination.

Can the course be taught in English: Yes.

Basic literature:

1. R. Mollin, Fundamental number theory and applications, Chapmann and Hall, Boca Raton, 2008.
2. W. Sierpinski, Elementary theory of numbers, North-Holland, Amsterdam, 1988.

Recommended literature:

1. Adler, J. E. Coury, The theory of numbers; A text and the source book of problems, Jones and Bartlett Publishers, Boston, 1995.
2. G. H. Hardy, E. M. Wright, An introduction to the theory of numbers, Oxford university press, London, 1975.
3. L. J. Mordell, Diophantine equations, Academic press, London, 1969.
4. T. Nagell, Introduction to number theory, John Wiley and sons, New York, 1950.
5. K. H. Rosen, Elementary number theory and its applications, Addison-Wesley, Massachusetts, 1984.