M106	Elective Year 3	**Set theory**	L	S	E	ECTS
			1	0	1	4

The aim of the course. The objective of this course is to familiarize students with basic properties of sets. During the lectures we will introduce and analyze the basic concepts and prove their properties and their mutual links, accompanied by numerous examples, which will also illustrate the axiomatic foundations of theories. During the exercises students should adopt techniques of examining the properties of abstract sets and problem solving.

Prerequisites. Elementary mathematics.

Course content.
1. Axioms of the empty set, of the partitive set and of the union. Cartesian product and axiom of the pair. Set of the natural numbers and Peanno's axioms. Relations.
2. Equipotent sets. Cantor-Schroeder-Bernstein theorem. Finite and infinite sets. Countable and uncountable sets.
3. Axioms of the set theory. Axiom of choice and Zorn's lemma. Partially ordered sets and well ordered sets.

Learning outcomes

No.	Learning outcomes
1.	Determine properties of relations.
2.	Distinguish the axioms of the set theory.
3.	Apply the Zorn's lemma.
4.	Determine the structure of the set of natural numbers.
5.	Examine the equipotency of sets.
6.	Distinguish countable and uncountable sets.
7.	Construct a bijection between the equipotent sets.
8.	Describe properties of partially ordered and well ordered sets.

Relating the learning outcomes, organization of the educational process and estimation of the learning outcomes.

Organization of the educational process	ECTS	Learning outcomes **	Student activities*	The method of estimate	Points	
					Min	max
Lecture attendance	1	1-8	Lecture attendance, discussion, team work and independent work on given tasks.	Attendance sheets, tracking activities	0	4
Written exam. (colloquium)	1	1-8	Prepairing for written exam.	Evaluation.	25	48
Final exam.	2	1-8	Repetition of the subject matter.	Oral exam.	25	48
Total	4				50	100

Teaching and evaluation of knowledge. Attendance at lectures and exercises is required. The exam consists of written and oral part, and can be taken after completion of lectures and exercises. During the semester students can take colloquiums that replace the written examination.

Can the course be taught in English: Yes.

Basic literature:
1. P. Papić, Uvod u teoriju skupova, HMD, Zagreb, 2000.

Additional literature:
1. P.J. Cohen, Set Theory and the Continuum Hypothesis, Dover Publications, 2008.
2. J.M. Henle, An Outline of Set Theory, Springer, 1986.
3. S. Lipschutz, Set Theory and Related Topics, McGraw Hill, 1998.