MI005	**Mathematical aspects of electoral systems**	L	P	S	ECTS
		1	1	0	3

Course objectives. Students will be acquainted with some basic mathematical aspects of electoral systems, as for instance evaluation and designing of electoral systems, models of electoral systems, elementary methods of seat allocation and their properties, etc.

Prerequisities. Undergraduate study of mathematics or computer science.

Course content.
1. Classification of electoral systems. Plurality and proportional electoral systems fundamental methods of seat allocation. Examples of electoral methods and procedures of social choice. General model of electoral system. Properties of electoral systems (indicators; proportionality,representation).
2. Designing of electoral systems. Some well known electoral paradoxes. Basic properties of electoral methods in plurality electoral system and in proportional electoral system. Integer optimization approach to electoral formulas.

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	To classify given electoral systems according to its basic properties.
2.	To differentiate the methods in plurality electoral systems and in proportional electoral systems.
3.	To calculate numerical values which describe some electoral systems in examples from practice.
4.	To explain paradoxes that can occur in electoral systems.
5.	To use algorithms of some electoral methods for a seat allocation based on obtained votes.
6.	To analyze electoral data at practical situations and interpret their properties by means of numerical indicators.

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 the lectures	0.5	1,2	Presence in teaching, discussion	Signature lists, follow-up on teaching activities	3	10
Seminar work	0.5	2,3	Independent processing of the theme	Check and review text	5	10
Final exam	2	3,4,5,6	Preparation for knowledge verification	Check of correct answers (evaluation)	32	80
TOTAL	3				40	100

Teaching methods and student assessment. Basic terms, characteristics and mathematical aspects of electoral systems are introduced at lectures. The second part of teaching appointments is used for students' seminar works in relation to problems of electoral system. Lectures and

seminars are obligatory. Examination consists of written and oral part, and it holds after attended lectures. Successfully made seminar work influences on a final mark.

Can the course be taught in English: Yes

Basic literature:

1. P.G.Cortona et al.: Evaluation and Optimization of Electoral Systems, SIAM, Philadelphia, 1999
2. T. Marošević: Reviewed teaching papers from lectures 2018

Recommended literature:

1. A.D. Taylor and A.M. Pacelli: Mathematics and Politics – Strategy, Voting, Power and Proof, Springer, New York, 2008.
2. J.K. Hodge and R.E. Klima: The mathematics of voting and elections: a hands-on approach, AMS, Providence, 2005.