Course: Multiple Criteria Optimization	
Course instructors: Bogdana Stanojević	
Course type: elective	
Credit points ECTS: 12	
Prerequisites: Operations Research	

Course objectives:
Formal and practical understanding of decision making process in situations where multiple criteria for decision evaluation exist. Three basic cases are considered: when it is needed to chose one decision among a set of predefined decisions, when the set of decisions is discrete and when the set of decisions is continuous.

Learning outcomes:
Students will get understanding of one significant area of operations researches, and will be capable of independent scientific work in this field. The students should be able to recognize the multiple criteria optimization problems in practice, define appropriate mathematical models, and solve them using the aquired knwledge.

Course description (outline):
Theoretical classes
Introduction and basic terminology. Scalarization techniques: weighted sum method, the epsilon-constraint method, the hybrid method, the elastic constraint method, Benson's method. Nonscalarizing methods (lexicographic, max-ordering). Multiple criteria linear and non-linear programming. Multiple objective combinatorial optimization.
Practice classes

References:
[1] Matthias Ehrgott, Multicriteria Optimization, second edition, Springer Berlin Heidelberg New York, 2005.
[2] Salvatore Greco, Matthias Ehrgott, Jose Rui Figueira (Eds.), Multiple Criteria Decision Analysis: State of the Art Surveys, second edition, Springer, 2016.
[3] Panos M. Pardalos, Antanas Žilinskas, Julius Žilinskasanos. Non-Convex Multi-Objective Optimization, Springer International Publishing, 2017.

Active teaching hours: 5	Theoretical classes: 5	Practice classes:

Methods of teaching:
Classic lectures including students' interaction. Students' knowledge will be tested through homework and seminar papers. The final exam checks the comprehensive understanding of the covered topics.

Grading structure (100 points)
pre-exam activities: 10 marks; seminar work: 30 marks. Oral exam: 60 marks.