

Course title: Operational Research

ECTS credit allocation (and other scores): 3

Semester: spring

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Social sciences

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Lesław Markowski, leszekm@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Basic methods of solving optimization problems. Diet problem and production problems. Allocation theory. Introduction to linear programming, components of LP models, assumption of LM models, decision variables, objective function, constraints, graphic solution, no feasible solution, unbounded problems, redundant constraints, simplex method, principle of duality, sensitivity analysis. The integer problem. Transport issue, initial feasible transportation solution. Allocation issue. Network programming, PERT and CPM, network diagram, deterministic and stochastic time.

LECTURES: Basic methods of solving optimization problems. Diet problem and production problems. Allocation theory. Introduction to linear programming, components of LP models, assumption of LM models, decision variables, objective function, constraints, graphic solution, no feasible solution, unbounded problems, redundant constraints, simplex method, principle of duality, sensitivity analysis. The integer problem. Transport issue, initial feasible transportation solution. Allocation issue. Network programming, PERT and CPM, network diagram, deterministic and stochastic time. Stochastic models and forecasting.

Learning purpose: Acquiring basic knowledge in the field of application of operational research in company management

On completion of the study programme the graduate will gain:

Knowledge: The student is able to use the operational research models in organization management

Skills: The student is able to use in practice simple models in the field of operations research

Social Competencies: The student is able to communicate the results of the analyzes in a communicative way

Basic literature: 1) Stacho J., Department of Industrial Engin, Introduction to Operations Research Deterministic Models, wyd. Columbia University In The City Of New York, 2014 ; 2) Stevenson W.J. Introduction to Management Science, printed by IRWIN R.R. Donnelley & Sons Company, USA, 1989; 3) Jędrzejczyk Z., Kukuła K. (red.), Skrzypek J., Walkosz A., Badania operacyjne w przykładach i zadaniach, wyd. Wydawnictwo naukowe PWN, 2011

Supplementary literature: 1) J.K. Sharma, Operations Research: theory and application,, wyd. Macmillan Publishers, 2002 ; 2) Trzaskalik T., Wprowadzenie do badań operacyjnych z komputerem, wyd. Polskie Wydawnictwo Ekonomiczne, 2008 ; 3) Grzywińska-Rąpca M. Markowski L., Employment and economic entities in the Polish financial sector from 2005-2016, wyd. Econometrics. Advances in Applied Data Analysis, 2018, t. 1(59), s. 79-93; 4) Markowski L., Wędrowska E., Zastosowanie metody k-średnich do klasyfikacji spółek giełdowych sektora IT, wyd. Monografie i opracowania SGH, Współczesne aspekty informacji, Warszawa, 2012, t. IV, s. 155-167; 5) Markowski L, Rutkowska-



Ziarko A., The effectiveness of simple diversification in comparison to Markowitz portfolio theory, wyd. Olsztyn Economic Journal, Wydawnictwo UWM w Olsztynie, 201, t. 6(1), s. 143-154

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 49

Student's independent work: 26