STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Operational Research and Econometrics	**1011105211011104996**

Field of study	Profile of study (general academic, practical)	Year /Semester
Engineering Management - Part-time studies -	**(brak)**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Marketing and Company Resources	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **16** Classes: **14** Laboratory: **-** Project/seminars: **-**	**3**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student knows economic terms and management problems, esppecially operation management problems.
2	**Skills**	Student has Excel and computer skills. Makes basic operations of matrix algebra.
3	**Social competencies**	Student works in team and prepares a project.

Assumptions and objectives of the course:

To develop skills of input-output modeling in management systems and optimization skills. To deliver knowledge about methods of management optimization and methods of estimation of an econometric model.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows typical optimization problems in management, their objectives and constraints. - [K2A_W01]
2. Knows problems of production structure, mixture and schedulling. - [K2A_W09]
3. Knows allocation problems for tasks, resources, travel route and for transport plan problem. - [K2A_W09]
4. Knows optimization methods with continous and descrete variable and linear or non-linear function. - [K2A_W09]
5. Knows multi criteria optimization methods. - [K2A_W09]
6. Knows ordinary least squares method. - [K2A_W10]

Skills:

1. Student builds input-output model of economic system effectiveness. - [K2A_U01]
2. Uses optimization methods: graphical, simplex, graphs and transportation algorithm. - [K2A_U04,]
3. Student estimates or optimizes models with Excel, GRETL and Solver (inc. Solver Foundation). - [K2A_U07]
4. Uses multi criteria methods (aims hierarchy, metacriterion, fulfillment degre, AHP). - [K2A_U04]
5. Estimates linear and linaerizable econometric models with OLS. - [K2A_U04]
6. Explains results of optimization and econometric models and uses them in management. - [K2A_U02]

Social competencies:

1. Student is aware of optimization benefits in management and planning. - [K2A_K03]
2. Spreads optimization in management problem solving. - [K2A_K05]
3. Can objectively assess and analyze data and solutions of management problems. - [S2A_K06]

Assessment methods of study outcomes

Partial mark:

a) task solving at lecture and exercise classes

b) solving Excel case studies

Pass mark:

a)Lecture and exercises pass mark based on partial marks and results of written test of tasks solving.

b) Laboratory pass mark based on partial marks and results of case studies to be solved using a computer.

Course description

1. Estimation of linear and linearizable econometric models with OLS.
2. Clasification and modeling of decision tasks. Problems of production structure, mixture, resource division, transportation and tasks allocation.
3. Linear programming. Simplex and graphical method.
4. Multi-criteria continous programming. Metacriterion, objectives hierarchy.
5. Multi-criteria integer programming. Fulfillment degre, AHP.
6. Net programming. CPM ? critical path method. PERT-program evaluation and review technique.
7. Transportat optimization problem and Little algorithm.
8. Decisions under risk. Decision tree and a newsboy problem.

DYDACTIC METHODS: lecture with problem analysis, exercises, case study.

Basic bibliography:

1. Badania operacyjne, Sikora W. (red.), PWE, Warszawa 2008.
2. Brzęczek T., Gaspars-Wieloch H., Godziszewski B., Podstawy badań operacyjnych i ekonometrii, Wydawnictwo PP, Poznań 2010.
3. Józefowska J., Badania operacyjne i teoria optymalizacji, Wydawnictwo PP, Poznań 2011.
4. Kufel T., Ekonometria. Rozwiązywanie problemów z wykorzystaniem programu GRETL, WN PWN, Warszawa 2011.
5. Przykłady i zadania z badań operacyjnych i ekonometrii, Sikora W. (red.), Wyd. UEP, seria MD 163, Poznań 2005.

Additional bibliography:

1. Anholcer M., Gaspars H., Owczarkowski A., Ekonometria z Excelem Wyd. UEP, Poznań 2010.
2. Ekonometria i badania operacyjne. Zagadnienia podstawowe, Guzik B. (red.), Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań 2003
3. Trzaskalik T., Wprowadzenie do badań operacyjnych z komputerem - CD, PWE, Warszawa 2008.
4. Witkowska D., Podstawy ekonometrii i teorii prognozowania, Oficyna Ekonomiczna, Kraków 2006.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	16
2. Exercises	14
3. Consulting	10
4. Own studies preparing to classes and passes	30

Student's workload

Source of workload	hours	ECTS
Total workload	70	3
Contact hours	40	2
Practical activities	14	1