COURSE DESCRIPTION CARD - SYLLABUS

Course name

Operational Research and Econometrics

Course

Field of study

Engineering Management

Year/Semester

1/1

Area of study (specialization)

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

Student knows basics of statistics and probability calculus

Course objective

Teach student to plan decisions to optimize inputs or outputs under resouces constraints. To explain ideas of optimization methods and algorithms. Teach econometric modelling and its applications.

Course-related learning outcomes

Knowledge

1. Student knows typica problems of logistics that can be solved using operation research [P7S_WG_02].

2. Knows graphical method and simplex for linear programming [P7S_WG_04].

3. Knows the methods of multicriteria descrete tasks solving [P7S_WG_08].

4. Knows ordinary least squares method, its assumptions, properties and applications [P7S_WG_03].

Skills

1. Student can solve optimization tasks using Excel Solver add-in [P7S_UW_01; _03].

2. Understands solving idea of graphical method and simplex [P7S_UW_04].

3. Solves multi criteria decision tasks with appropriate method [P7S_UW_06].

4. Can estimate econometrics model, assess significancy, goodness of fit and analyse results. In particular estimates costs model due to quantity of one or many products and sales trend [P7S_UW_02].

Social competences

Is able to persuade mangement practicioners to benefits of optimization and modelling usage [P7S_KK_01-02; P7S_KO_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Partial assessment is done at:

a) lectures informally in questions about current topic,

b) tutorials as adnotation about student's work over current topic and his progress.

c) laboratories by discussing progress in cases analysis.

Pass grades are three:

a) lecture grade comes from theory test and problem questions.

b) tutorials grade comes from solving tasks test and fulfiled workcards.

c) laboratories grade takes into account case solved or prepared and presented by students teams.

Programme content

1. linear programmes (LP) formulation: product assortment, blending problem, transportation and transshipment, multiperiod scheduling, using of Excel add-in Solver

2. linear programming. simplex, graphical methods, sensitivity analysis,

3. transportation and transshipment problem, balanced, unbalanced supply-demand,

4. descrete multigoal tasks and methods, multigoal optimality, ranks, optimization degree, AHP,

5. decisions under uncertainty and risk: strategies, news boy, decision tree, spare parts stock,

6. estimation of an econometric model with ordinary least squares, assessment of significancy and goodness of fit, and forecasing and forecast expected error calculus.

Teaching methods

lecture focused at problem, tutorial in solving tasks, case study

Bibliography

Basic

1. Anholcer M., Gaspars H., Owczarkowski A., Ekonometria z Excelem, Wyd. UEP, Poznań 2010.

2. Brzęczek T., Gaspars-Wieloch H., Godziszewski B., Podstawy badań operacyjnych i ekonometrii, Wyd. PP, Poznań 2010.

3. Przykłady i zadania z badań operacyjnych i ekonometrii, Sikora W. (red.), Wyd. UEP, MD, Poznań 2005.

Additional

1. Józefowska J., Badania operacyjne i teoria optymalizacji, Wydawnictwo PP, Poznań 2011.

2. Sikora W. (red.), Badania operacyjne, PWE, Warszawa 2008.

3. Trzaskalik T. (red.), Wprowadzenie do badań operacyjnych z komputerem + CD, PWE, Warszawa 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests, teams prepare assigned cases solutions) [1]	55	2,0

[1] delete or add other activities as appropriate