

# SUBJECT DATASHEET

# ANALYSIS OF PRODUCTION AND OPERATIONS DECISIONS BMEGT20MN15

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## I. SUBJECT DESCRIPTION

#### 1. SUBJECT DATA

**Subject name** 

ANALYSIS OF PRODUCTION AND OPERATIONS DECISIONS

ID (subject code) BMEGT20MN15

Type of subject contact classes

Course types and lessonsType ofTypeLessonsassessmentLecture2exam gradePractice2Number of creditsLaboratory05

**Subject Coordinator** 

Name Position Contact details

Dr. Koltai Tamás professor koltai.tamas@gtk.bme.hu

Educational organisational unit for the subject

Department of Management and Business Economics

**Subject website** 

https://edu.gtk.bme.hu

Language of the subject

magyar - HU; angol - ENG

Curricular role of the subject, recommended number of terms

Programme: Finance MSc (in English) from 2019/20/Term 1 AUTUMN start

Subject Role: Compulsory Recommended semester: 4

Programme: Finance MSc (in English) from 2019/20/Term 1 SPRING start

Subject Role: Compulsory Recommended semester: 3

Programme: Management and Leadership MSc (in English) from 2019/20/Term 1

Subject Role: Compulsory Recommended semester: 4

Programme: Master's programme in Management and Leadership from 2019/20/Term 1 (Autumn term start)

Subject Role: Compulsory Recommended semester: 4

Programme: Master's programme in Management and Leadership from 2020/21/Term 2 (Spring term start)

Subject Role: Compulsory Recommended semester: 3

Programme: Production and Operations Management specialisation

Subject Role: Compulsory for the specialisation

Recommended semester: 3

#### **Direct prerequisites**

Strong None
Weak None
Parallel None
Exclusion None

#### **Validity of the Subject Description**

Approved by the Faculty Board of Faculty of Economic and Social Sciences, Decree No: 581046/15/2021. Valid from: 24.11.2021.

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#### 2. OBJECTIVES AND LEARNING OUTCOMES

#### **Objectives**

The subject of Analysis of Production and Operations Decisions aims to teach and practice the analysis of complex production and service problems using a business simulation game, as well as solving case studies. The examined problems necessitate a series of solutions to the resource allocation tasks that often occur in management practice. The subject develops the students' ability to create independent models and formulate problems, as well as shows how complex decisions in the field of production and service management can be examined and supported with modern computer tools. With the help of the management simulation that accompanies the whole subject, the students directly apply their group decision-making skills and their previous knowledge of production and service management. The simulation game is evaluated using data envelopment analysis (DEA), which is also part of the semester curriculum. Thus, the learned evaluation and analysis method is also applied in practice.

#### **Academic results**

#### Knowledge

- 1. Knows the basic methods of complex resource allocation problems.
- 2. Knows and understands the tools of mathematical modelling of the studied problems.
- 3. Understands the connections between the areas of corporate operation and production management.
- 4. Has confident methodological knowledge in the field of quantitative decision analysis, understands and understands the potential possibilities of the application of modern data analysis.

#### Skills

- 1. Able to formulate problems related to production and service processes verbally and analytically, to synthesize basic theories and practical aspects, to make rational arguments, ie to form and defend one's opinion during discussions in different fields of operational communication.
- 2. Able to plan the process of solving production and service problems and follow the path from problem recognition to solution.
- 3. In his professional vocabulary, he confidently uses the basic concepts of decision analysis, operations research and informatics, the professional language of the profession, and the elements of the special vocabulary based on them.
- 4. Able to interpret, evaluate, and use data related to production and services in performing design and analysis calculations.

#### Attitude

- 1. Accepts that the possibility of improving certain company processes and their optimal operation can be determined by quantitative means.
- 2. Consciously represents the methods with which he / she works in his / her own profession and accepts the different methodological peculiarities of other disciplines.
- 3. It strives to make its decisions in consultation with the supervised staff and, where possible, in cooperation with them.
- 4. Has a comprehensive systems approach in the field of quantitative modelling.

#### Independence and responsibility

- 1. Being able to perform and manage complex tasks in accordance with the professional expectations of a professional work community.
- 2. Independent, constructive and assertive in forms of cooperation inside and outside the institution.

#### **Teaching methodology**

Lectures; participation in a production simulation game that accompanies the entire semester; processing case studies inde-pendently and in group work.

#### **Materials supporting learning**

- Koltai, T, Kall N. Tatay V.: Termelsi s szolgltatsi dntsek elemzse, oktatsi segdlet, 2017
- Szimulcis jatek kziknyv
- Egyb, az oktatk ltal kiadott oktatsi segdletek (https://edu.gtk.bme.hu)
- Koltai T.: Termelsmenedzsment, Typotex, 2006
- Koltai T.: Alkalmazhatk-e a termelsmenedzsment kvantitativ sszefggsei a gyakorlatban, Harvard Business Manager (Magyar kiads), 5(2), 52-59, 2003.
- Koltai T.: A kvantitatv sszefggsek jelentsge a termelsmenedzsmentben, CEO magazin, 4(4), 11-14, 2003.
- Ragsdale, C. T.: Managerial Decision Modelling, Thomson, 2007.
- Lecture notes and slides uploaded to the Moodle page of the course (https://edu.gtk.bme.hu)
- Simulation game manual
- Ragsdale, C. T.: Managerial Decision Modelling, Thomson, 2007.
- Reid, R.D. & Sanders, N.R.: Operations Management: An Integrated Approach, 7th Edition, Wiley, 2020
- International Journal of Management Education, 20(3), p. 17.
- Koltai, T., Tams, A. (2022). Performance evaluation of teams in business simulation games with weight restricted data envelopment analysis models. The
- Hillier, F. S., Lieberman, G. J. (1995). Introduction to Operation Research, McGraw-Hill, New York.
- Research, 132, 245-259.

- Dyson, R. G., Allen, R., Camanho, A. S., Podinovski, V. V., Sarrico, C. S., Shale, E. A. (2011). Pitfalls and protocols in DEA. European Journal of Operations
- Davenport, T. H. (2006) Competing on analytics. Harvard Business Review, 84(1), 98-107, 134.
  Charnes, A., Cooper, W.W., Rhodes, E. (1978). Measuring the efficiency of decision-making units, European Journal of Operational Research, 2(6), 429-444.
- Cooper, W. W., Seiford, L. M., Tone, K. (2007). Data envelopment analysis. Springer.

# II. SUBJECT REQUIREMENTS

#### TESTING AND ASSESSMENT OF LEARNING PERFORMANCE

#### **General Rules**

The learning outcomes set out in point 2.2 are assessed during the examination period by a written examination

#### Performance assessment methods

A. Detailed description of performance evaluations during the term: The result of the simulation game running during the semester is part of the grading of the subject. A maximum of 25 points can be reached based on the performance given in the game. A minimum of 10 points can be gained for the comple-tion of the game. The portion between 10 and 25 points is calculated proportionally based on the DEA efficiency score calculated from the results of the simulation game. For 100% efficiency you get an extra 15 points, for 0% efficiency you get an extra 0 points. The value between 0 and 15 points is given to the student as a percentage of the efficiency score. B. Performance evaluation during the examination period (exam): Written examination based on problem solving. Elements of the exam: 1. written performance evaluation: checking the theoretical background and practical application of the topics covered during the semester. The majority of the 75 points available in the exam can be obtained by solving the calculation examples (90%), a smaller proportion by answering the theoretical questions (10%).

#### Percentage of performance assessments, conducted during the study period, within the rating

• Participation in the simulation game is mandatory during the semester. As a result of the simulation game, a maximum of 25 points can be obtained, which is 25% of the subject's qualification.: 25

#### Percentage of exam elements within the rating

• written exam: 75%

• the result of the simulation game: 25%

• total: 100%

#### Conditions for obtaining a signature, validity of the signature

The condition for obtaining the signature is the successful completion of the simulation game.

#### **Issuing grades**

Excellent	95-100
Very good	90–94
Good	80-89
Satisfactory	65–79
Pass	50-64
Fail	0-49

#### Retake and late completion

According to the Code of Studies

#### Coursework required for the completion of the subject

participation in contact classes	$14 \times 2 = 28$
simulation game analyses, decision making	32
independent acquisition of the written curriculum	45
exam preparation	45
total	150

#### Approval and validity of subject requirements

Consulted with the Faculty Student Representative Committee, approved by the Vice Dean for Education, valid from: 04.10.2021.

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### III. COURSE CURRICULUM

#### THEMATIC UNITS AND FURTHER DETAILS

#### Topics covered during the term

To achieve the learning outcomes set out in section 2.2, the course consists of the following thematic blocks.

- 1 Introduction, the description of the management simulation game that accompanies the semester.
- 2 Trial round of the simulation game. Preparing to start the game.
- 3 Application of Linear Programming (LP) in production and operations decisions (using Excel).
- 4 Interpretation of LP sensitivity test results. The significance and application of the objective function value function.
- 5 Processing of the "Coffee Blend Production" case study.
- 6 Processing of the "Rolling Line" case study.
- 7 Evaluation of the completed rounds of the simulation game, analysis of experiences.
- 8 Basic concepts of data envelopment analysis (DEA).
- 9 Graphical solution of "1 input 1 output" case.
- 10 Graphical solution of "2 input 1 output" case.
- 11 Modelling of general cases of radial models (input-oriented, output-oriented primary and dual models, phases I and II).
- 12 Investigation of non-radial models and weight constraints.
- 13 Computer support for DEA (Excel models, PIM-DEA software).
- 14 Evaluation of the result of the simulation game, summary.

#### **Additional lecturers**

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Approval and validity of subject requirements

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