



## RTU Course "Quantitative Methods in Management"

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### General data

Code	IĀS515
Course title	Quantitative Methods in Management
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Professional
Field of study	Mathematics and Statistics
Responsible instructor	Remigijs Počs
Academic staff	Māris Buiķis Velga Ozoliņa
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Abstract	Quantitative methods, economic-mathematical models and decision-making process. Specific models of linear programming. Integer programming tasks. Models of development scenario choice. Transportation problems and optimization of transshipment. Goal programming. Specific methods for time series analyses and forecasting. Econometric modelling. Multiple and dynamic regression. Nonlinear econometric models. Parameter estimation methods. Matrix-type (input-output) models. Game theory elements.
Goals and objectives of the course in terms of competences and skills	To introduce students with the main quantitative methods, which are applied in analysis of economic situations and management problems, as well as during the decision-making process. To form the ability to choose the most appropriate method to solve a particular problem. To form the ability to develop a model corresponding to a particular method and to obtain results, using appropriate algorithms and software, as well as the ability to understand the results and to apply them in analysis of economic processes and elaboration of management decisions.
Structure and tasks of independent studies	Individual work is organised in the form of practical assignments (laboratory assignments), quizzes and exercises. During laboratory assignments students choose a method according to the given characterisation of situation and data, form the model, solve it and describe the obtained results, including answers to the stated questions. Additionally students can fill out quizzes and exercises, improving their skills to apply quantitative methods.
Recommended literature	<ol style="list-style-type: none"> <li>1. Počs R. Kvantitatīvās metodes ekonomikā un vadīšanā. Mācību līdzeklis. Rīga, RTU Izdevniecība, 2003. – 148 lpp.</li> <li>2. Brīvers I. Lineārā programmēšana. Rīga: Rasa ABC, 2001. – 35 lpp.</li> <li>3. Frolova L. Matemātiskā modelēšana ekonomikā un menedžmentā: teorija un prakse. Rīga, Izglītības sōji, 2005. – 438 lpp.</li> <li>4. Kļaviņš D. Optimizācijas metodes ekonomikā. I, II. Rīga: Datorzinību centrs, 2003. – 271 lpp.</li> <li>5. Krastiņš O. Statistika. Mācību grāmata augstskolām. Rīga, Latvijas Republikas centrālā statistikas pārvalde, 2003. – 267 lpp.</li> <li>6. Krastiņš O. Ekonometrija. Mācību grāmata augstskolām. Rīga, Latvijas Republikas centrālā statistikas pārvalde, 2003. – 207 lpp.</li> <li>7. Peļņa M. Optimizācijas uzdevumi ekonomikā. Rīga: Datorzinību centrs, 2003. – 159 lpp.</li> <li>8. Šķiltere D. Pieprasījuma prognozēšana: Mācību līdzeklis. Rīga: Latvijas Universitāte, 2001, - 84 lpp.</li> <li>9. Vasermanis E., Šķiltere D. Prognozēšanas metodes. Rīga: Izglītības sōji, 2004. - 121 lpp.</li> <li>10. Vasermanis E., Šķiltere D. Statistika I. Mācību līdzeklis. Rīga: Latvijas Universitāte, 1996. -76 lpp.</li> <li>11. Andersen D. R., Sweeney D. J., Williams T. A. An Introduction to Management Science: Quantitative Approaches to Decision Making. USA, 2002.</li> <li>12. Buglear J. Quantitative Methods for Business. Oxford: Elsevier Butterworth-Heinemann, 2005. – 685 p.</li> <li>13. Dewhurst F. Quantitative Methods for Business and Management. Berkshire: McGraw-Hill Education, 2006. – 502 p.</li> <li>14. Heizer J., Render B. Operations Management. New Jersey: Pearson Prentice Hall, 2007. – 614 p.</li> <li>15. Oakshott L. Essential Quantitative Methods for Business, Management and Finance. Hampshire: Palgrave Macmillan, 2006. – 484 p.</li> <li>16. Swift L., Piff S. Quantitative Methods for Business, Management and Finance. Hampshire: Palgrave Macmillan, 2005. – 882 p.</li> <li>17. William G. Zikmund. Business Research Methods. 6th edn. The Dryden Press, 2000, 660 p.</li> <li>18. Федосеев В.В., А.Н.Гармаш, Д.М. Дайитбегов и др. Экономико -математические методы и прикладные модели: Учеб. пособие для вузов/ Под ред. В.В.Федосеева-М</li> </ol>
Course prerequisites	Mathematics, information science, economics, quantitative methods in economics, statistics

### Course outline

Theme	Hours
Introduction – the most significant quantitative methods, the notion “model” and decision-making process.	2
Special applications of linear programming.	12

Specific methods of time series analyses and forecasting.	2
Non-linear econometric models.	2
Multiple and dynamic regression models.	4
Parameter estimation methods.	2
Input-output models.	4
Game theory elements.	4
Practical assignments.	32

**Learning outcomes and assessment**

Learning outcomes	Assessment methods
Students are able to name and characterise the main quantitative methods, which are used in economics. Students name the method, which corresponds to the characterisation, or describes a particular method.	Quiz, exam questions
Students know what a model is, and are able to construct a model, which corresponds to a particular method. Students define a model, develop a model in accordance with a particular method, using given information and data.	Quiz, laboratory assignments, exercises, exam
Students are able to use the model to obtain results. Students obtain results, using appropriate algorithm and software for the chosen method.	Laboratory assignments, exercises, exam
Students are able to analyse the obtained results. Students are able to explain the meaning of the obtained results.	Quiz, laboratory assignments, exercises, exam
Students are able to interpret the values of indicators, which are used for the characterisation of a particular model or situation. Students are able to evaluate the correspondence of a particular indicator to definite criteria.	Quiz, laboratory assignments, exercises, exam
Students understand the possibilities to use quantitative methods in the analysis of economic problems.	Quiz, laboratory assignments, exercises, exam

**Study subject structure**

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	2.0	0.0		*	