

Course abstract Quantitative methods in procurement management and public-private partnership (Количественные методы в задачах управления закупками и в ГЧП)

<p>1. Course number, title, and ECTS</p>	<p>M.2.Б.00.3, Quantitative methods in procurement management and public-private partnership, Forth Year, Basic Course Lectures 28 Seminars & Practical Classes 36 Contact Hours 85 Self-study Hours 106</p>
<p>2. Course instructors during Self-Evaluation year and site visit year</p>	<p>Belenky A.S., Doctor of Sciences in Applications of Computer Engineering, Mathematical Modeling and Mathematical Methods in Scientific Research (Technical), Ph.D. in Control Theory and Systems Analysis (mathematics), Tenured Professor, National Research University Higher School of Economics</p>
<p>3. Prerequisites for the course</p>	<p>M.1.Б.00.2 Public Economics-1</p>
<p>4. Course objectives in relation to total curriculum</p>	<p>The course has been designed for interested students as an introduction to a) principles and basic techniques of mathematically modeling procurement management problems and problems of forming public-private partnerships, b) ideas and basic techniques of quantitative methods for analyzing and solving these problems, and c) standard software implementing these methods</p>
<p>5. Learning outcomes</p>	<p>As a result of studying the course, the students are expected:</p> <ul style="list-style-type: none"> - To understand approaches to mathematically modeling procurement management problems, to be familiar with basic types of mathematical models formalizing these problems, and to possess basic techniques of developing simplest models of all these types on their own, - to be able a) to quantitatively estimate perspectives of forming public-private partnerships, b) to develop negotiation strategies aimed to convincing potential investors and partners to contribute to solving particular management problems in the framework of public-private partnerships, and c) to find financial and legal conditions of forming public-private partnerships that are acceptable to all the potential (negotiating) partners, - to understand basic concepts and ideas of systems analysis, robust optimization, game theory, and mathematical statistics as major tools for mathematically modeling, quantitatively analyzing, and solving practical procurement management and public-private partnerships problems.
<p>6. Course description</p>	<p>The students will study basic ideas, methodologies, and techniques of systems analysis, mathematical modeling, optimization methods, applied mathematical statistics, and game theory by considering procurement management problems that arise in practice, and by participating in business games conducted by instructors and imitating negotiations associated with</p>

	<p>forming public-private partnerships.</p> <p>Procurement management problems to be discussed in the proposed course include: a) choosing types of procurement contracts and approaches to their design, analysis, and execution, b) principles of competitive tendering and contract negotiations, c) competitive trades and major types of auctions held in the markets, d) forming auction lots, batch-bidding, and basic elements of cross-market contracts, e) collusions, corruption, and strategies of fighting these phenomena in public procurement, and f) bidding liability in and formats of risky bids.</p> <p>Public-private partnership problems to be discussed in the proposed course include: a) basic differences between federal (state) procurement and public-private partnership, b) attracting investments in large-scale projects that cannot be financed in full by federal and local authorities, c) principles of sharing risks associated with investing and principles of cooperation between federal and local authorities and private partners in the framework of public-private partnership, d) developing mechanisms of sharing the expected profit among the partners in public-private partnerships.</p>
<p>7. Learning and teaching methods</p>	<p>The following educational techniques are used in teaching the course:</p> <ul style="list-style-type: none"> • Lectures • Seminars • Practical Classes and Business Games • Homework and course work assignments
<p>8. Major topics covered</p>	<p>Major mathematical topics to be covered to let the students understand and use basic mathematical modeling techniques include: a) linear programming, b) multi-criteria optimization under linear constraints, c) minimax problems on polyhedra, d) games on polyhedral sets with nonlinear payoff functions, e) integer programming, f) mathematical programming with mixed variables, g) stochastic programming, and e) flows in networks. Studying all these topics will be based on explaining the students the fundamentals of the theory of linear equations and inequalities, finite cones, and the duality principles in mathematical and integer programming, and it will be accompanied by providing geometric images illustrative of the facts and assertions to be studied. Each and every type of mathematical models and mathematical techniques to be studied will be discussed on the example of at least one of the problems arising both in public procurement and in public-private partnerships.</p>
<p>9. Prescribed books and readings</p>	<ol style="list-style-type: none"> 1. Dimitri N., Piga G., Spagnolo, G., (Editors) Handbook of Procurement, 2006, Cambridge University Press, 2006 2. Sollish F., Semanik J. The Procurement and Supply Manager's Desk Reference, Wiley; 2 edition, 2012 3. Baily P., Farmer D., Procurement, Principles, Management, 11th ed. Trans-Atlantic Publications; Inc., 2015

4. Coss, L. Procurement Methods: Effective Techniques: Reference Guide for Procurement, Professionals, BookBaby, 2016
5. Guth, S. Project Procurement Management: A Guide to Structured Procurements, CreateSpace Independent Publishing Platform; 2 edition, 2016
6. Emmett S., Wright P. Excellence in Public Sector Procurement: How to control costs and add value, Liverpool Academic Press, 2012
7. Semple A., Cook M., A Practical Guide to Public Procurement, Oxford University Press; 1st edition, 2015
8. Pitzer J. T., Introduction to Public Procurement, National Institute of Governme; 3rd edition, 2009
9. Engel E., Fischer R.D., Galetovic A., The Economics of Public-Private Partnerships: A Basic Guide, Cambridge University Press, 2014
10. Morley M., The Public-Private Partnership Handbook: How to Maximize Value from Joint Working, Kogan Page, 2015
- .9. Geddes M. Making Public Private Partnerships Work: Building Relationships and Understanding Cultures, Routledge, 2017
111. Cellucci T. A. A Guide to Innovative Public-Private Partnerships: Utilizing the Resources of the Private Sector for the Public Good, Government Institutes, 2011
12. Алескеров Ф.Т., Беленький А.С., Васильев С.Н. Две математические модели организации государственно-частного партнерства в сфере разработки природных ресурсов *Электронный научный журнал "Георесурсы. Геоэнергетика. Геополитика"*, № 1 (9), с. 1-18, 2014
13. Беленький А. С. О размещении заказов посредством одношаговых аукционов // В кн.: X Международная научная конференция по проблемам развития экономики и общества: В 3 кн. / Отв. ред.: Е. Г. Ясин. Кн. 1. М. : Издательский дом ГУ-ВШЭ, 2010. С. 428-440.
14. Belenky A. Three Quantitative Management Problems in Public Procurement and Decision Procedures for Their Analysis and Solving // *Procedia Computer Science*. 2013. Vol. 17. P. 1142-1153.
15. Беленький А. С., Кузнецова И. В., Чубарова А. В., Шамрин А. Т. Формирование и оптимизация структуры портфеля государственных

	<p>заказов в условиях ограниченного бюджета методами математического программирования // Экономический журнал Высшей школы экономики. 2012. Т. 10. № 1. С. 88-104.</p> <p>16. Belenky A. A Rule for Determining the Winner in Sealed Ceiling Bids and Its Mathematical Properties // Экономический журнал Высшей школы экономики. 2009. N. 1. P. 3-18.</p> <p>17. Беленький А. С. О выборе правил проведения одношаговых аукционов в рамках закона 94-ФЗ // Госзаказ: управление, размещение, обеспечение. 2009. № 3. С. 2-11.</p> <p>18. Беленький А. С. Об одном правиле определения победителя в закрытых тендерах и его математических свойствах // Экономический журнал Высшей школы экономики. 2009. Т. 13. № 1. С. 3-18.</p> <p>19. Belenky A. Two rules of a sealed ceiling bid and their analysis by mathematical programming techniques // <i>Computers & Mathematics with Applications</i>. 2006. Vol. 52. P. 1711-1732.</p> <p>20. Journal of Public Economic Theory Special Issue: Special Issue on Public-Private Partnerships (D. Martimort, F. Menezes, M. Wooders), John Wiley & Sons, February 2015, Volume 17, Issue 1, Pages 1–146</p>	
10. Way of examining	Course work	0,2
	2 written tests	0,3
	Written or oral exam	0,5