

## Course syllabus: "Economics of Transport Projects, Transport Industry and Transportation Behavior"

Approved  
Academic supervisor  
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|                          |                                    |
|--------------------------|------------------------------------|
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| Course credits           | 4                                  |
| Classroom work (hours)   | 40                                 |
| Independent work (hour.) | 112                                |
| Year                     | 2 year                             |
| Course format            | Full-time                          |

### Course Description

#### Prerequisites

- Knowledge of main methods in public administration on municipal/city level.
- Basic knowledge of mathematical statistics and analysis tools and ability to apply these tools in modern software.
- Basic knowledge of English.

#### Course type

This course is optional for Urban Planning students.

#### Course abstract

Discipline "Economics of transport projects, transport industry and transportation behavior" is given to second grade students of the Master program, being an in-depth knowledge and practical skills in such areas as transport economics and transport mobility, the cores of which are presented in several lectures of basic course "Methodological essentials of Urban Transportation Planning".

Within the discipline students get ideas about:

- financing processes in infrastructural transportation projects of the cities;
- elasticity of demand on transport services;
- transport sociology and its survey instruments of citizen transportation behavior.

Separate issues of pricing and tariffs for transportation services, pricing and estimated valuation in transport construction, evaluation of the effectiveness of transport projects implementation, construction of schemes of state private partnership are considered.

Study of this discipline gives a set of professional knowledge and skills to prepare and take effective managerial decisions in scope of urban transportation systems development.

### Course Learning Objectives and Outcomes

#### Course Learning Objectives

The formation of the students' holistic view of the economics of urban transport projects, methods of planning and management, as well as the principles of their development and functioning of transportation projects.

#### Intended Learning Outcomes

After completing the course students **should**:

- Know the tools of economic planning in the context of development of the city transport system
- Know the basic theories and methods of studying the behavior of the travelers
- Know and be able to assess and predict the main characteristics of the demand for transport services
- Know and be able to apply methods of data collection for the transport behavior research
- Have an idea about the processes price formation for transport services, aspects of the regulation of the market of transport services
- Know the organizational and legal bases of the current tax system in respect of transport
- To be able to determine the cost of construction of transport infrastructure, to take into account the risks, the cost of changing
- Understand the mechanisms of organization and attraction of investments through public-private partnership

## Course plan

- Fundamentals of transport economics
- Demand for transportation services
- Methodological framework for studying transport behaviour
- Data collection, data mining
- Price and tariff formation for transportation services
- Transport infrastructure financing mechanisms
- Tax sources for road construction in Russia
- Price formation and rate setting in road construction
- Public-private partnerships in financing Russian road infrastructure projects — contemporary issues and potential problems
- Evaluating the effectiveness of transportation projects

## Detailed Course Plan

### Section 1. Fundamentals of transport economics.

**Lecture.** The role of the transport system in the city's economy and its role in solving social and economic problems. Transport services, its features and segments. The economic characteristics and features of urban transport systems.

Tools of economic planning development of the city transport system. Feasibility study for the development of urban transport infrastructure. Evaluation of the economic feasibility of the transport project on the basis of cost and benefit analysis.

Sources and methods of financing the maintenance and construction of transport projects in the urban district boundaries. Effect of different modes of transport on the efficiency of the urban economy.

**Seminar.** Economic and social effects of the functioning of the transport system (travel time, availability to the public transport fatigue, road accidents, congestion, changes in value of real estate and commercial properties, the tariff policy of the city authorities). Project introduction.

**Independent work** involves site-visiting of chosen transportation project

### Section 2. Demand for transportation services

**Lecture.** Trends in demand for transport services in urban areas.

Factors of demand (transport and geographical characteristics, clusters of consumers in terms of income and prices are reasonable service, the parameters of transport services at the speed of communication, warranty travel time, quality of transportation).

New features related to the development of custom IT-tools.

Economic instruments, regulation and restriction of the demand for transportation services in the city.

**Seminar.** Evaluation for transportation services demand elasticity. Project discussion

**Independent work** involves the analysis of case studies.

### **Section 3. Methodological framework for studying transport behaviour**

**Seminar.** Conceptual definition of mobility. «Management» research perspective. Approaches to the study of human movement and their evolution. Using the results in planning activity.

«Turn to Mobility» in sociological theory. The concept of mobility. «Mobile Methods». «Academic» approach of the transport behavior research. Analysis of cases.

**Independent work** involves the study of the basic approaches to human movement.

### **Section 4. Data collecting and data mining**

**Lecture.** Data collection methods classification in transport behavior research. The poll, statistical records, automatic control. Big data. Quantitative and qualitative approaches.

The specific use of the results of transport research. Transportation behavior predicting, investment justification, route network optimization.

**Seminar.** Classical 4-stage transportation model.

**Independent work** involves the collection of data on movements on the basis of the vehicle's diary and a GPS navigator and a comparison of results for toll roads project.

### **Section 5. Price and tariff formation for transportation services**

**Seminar.** The basic principles of transport fares. Formation of prices for transport services depending on the degree of competition in the transport market.

Pricing in the private sector. Profit maximization. Price discrimination. Implementation of pricing policy. Tariff trap.

**Independent work** involves fare menu optimization for transportation project.

### **Section 6. Transport infrastructure financing mechanisms**

**Lecture.** The economic content and the need to finance the construction of the vehicle.

The use of transport infrastructure: an optimum price, social welfare maximization. Formation of the trip price. Pricing at marginal cost. Static and dynamic pricing. Pricing congestion. The impact of pricing on market access.

Regulation of the market of transport services. Instruments of state regulation of the market of transport services. Environment. Safety. The competition in the public transport system. Competition policy: requirements and free access.

The structure of public investment in the transport system: major tax sources and mechanisms for financing road construction («Road Pricing»). Development of theoretical research in the field of taxation. Ideas Pigou, William Vickrey, Reuben Jacob Smeed.

Analysis of the world experience in the application of tax instruments in practice.

**Seminar.** Discussion of the specific application of tax instruments in practice, in particular, specific to the national system of funding roads. Development financial model for transportation project.

**Independent work** involves the study of the various financing transport infrastructure projects

## **Section 7. Tax sources of road construction in Russia**

**Seminar.** Evolution of the tax sources of financing the construction and maintenance of roads in the Russian Federation. Current structure of tax revenues.

Analysis of changes in the tax status of the sources of financing and road funds.

Organizational-legal bases of existing taxes and fees associated with the acquisition and maintenance of vehicles.

Discussion of transportation projects.

**Independent work** involves analysis of prospects for the development of road pricing in Russia.

## **Section 8. Price formation and rate setting in road construction**

**Lecture.** Determining the value of road infrastructure construction projects. Approximate cost structure for the construction of highways in Russia. A comparative analysis of approaches to the formation of the cost of road construction in foreign countries.

Institutional factors affecting the construction of road infrastructure: site preparation and reservation of land plots; preparation of project documentation; procedures coordination of project documentation and obtaining a building permission; tendering and contracting system; mechanisms of expert and citizen control.

**Seminar.** Discussion of possible factors for reducing the construction and operation of facilities costs (e.g. use of resource-saving technologies and materials, the new standardization and regulation of the construction process, the use of new forms of contractual arrangements, the use of innovative methods in the design).

**Independent work** involves the calculation of the cost of construction of the LRT project, further development of financial model.

## **Section 9. Public-private partnerships in the financing of transport infrastructure in Russia: the current state and main problems**

**Lecture.** The current state of the transport infrastructure in Russia, main objectives of its development. The role of PPP in the existing system of financing transport infrastructure in Russia. PPP market development in Russia - 10 years of progress (for example, roads).

Forms of public-private partnerships, used in world practice. Regulatory PPP regulation. Approaches to the evaluation of the effectiveness of the transport infrastructure development through PPP in the world.

Features of attraction of investments in construction and reconstruction of transport infrastructure. An analysis of the most appropriate organizational forms of PPP for development of transport infrastructure in modern Russian conditions. Evaluation of the benefits of the implementation of projects based on the life cycle of contracts.

Description of the main mechanisms for the formation of the revenue base of PPP projects (the payment for the availability, guarantee minimum return, direct collection of fees). The general analysis tools and sources of funding projects. Creating conditions for attracting private investment in the development of cities and agglomerations of transport infrastructure.

**Seminar.** Advantages and disadvantages of PPPs. PPP implementation problems in the financing of transport infrastructure system and basic directions of their solutions. Development of organizational model for transportation project.

**Independent work** involves selection of the optimum organization form of PPP for the project

## **Section 10. Evaluating the effectiveness of the transport projects**

**Lecture.** Description of the mechanism of propagation effects of construction and modernization of transport infrastructure in the socio-economic indicators of development of cities, regions and agglomerations.

Methodological basis of assessment of the impact of the network settings on the roads main indicators of socio-economic development: global best practices (USA, European Union, United Kingdom) and the Russian reality.

Economic models for the a priori / a posteriori assessment of the impact of construction projects. Reconstruction of roads as a driver for of socio-economic development.

**Seminar.** The effects of investment in transport infrastructure: sintering, investment, social. The structure of the parameters and criteria for the selection of efficient infrastructure projects.

**Independent work** involves the calculation the effects for the transportation project

### Methods of Instruction

During lectures and holding seminars, the following educational technology: business games, analysis of practical problems and case studies, discussions on the basis of reports on given topics. It is possible to attract experts in the field of urban transport.

### Grading and Guidelines for Knowledge Assessment

#### Grading System

| Control Type / week | form of control          | 2 year |   | Options  |
|---------------------|--------------------------|--------|---|--|
|                     |                          | 1      | 2 |  |
| <b>Current</b>      | Activity at the seminars | *      | * | It assesses work on seminars, as well as the quality of the reports that students do in the classroom.   |
| <b>Final</b>        | Exam                     |        | * | Group work. Feasibility study, incl. financial model should be developed for chosen transportation project within the city in form of presentation. E.g. of transportation projects: LRT line, toll road, station. |

#### Criteria for project evaluation

| Nº p / p | Indicator assessment   | Number of points |
|----------|--|------------------|
| 1        | Justification of the relevance of the chosen topic   | 1 point          |
| 2        | The structure of the work (there are: the introduction, the purpose of the work, formulation of the problem, problem solving, conclusions, list of references) | 1 point          |
| 3        | Compliance with the results of the stated objectives   | 1 point          |
| 4        | The novelty of the proposal, which reflects the author's own contribution and originality  | 1 point          |
| 5        | Depth study of the problem   | 1 point          |
| 6        | Using modern scientific literature in the preparation of work  | 1 point          |

|               |   |                  |
|---------------|---|------------------|
| 7             | Presentation quality: structure, design, content  | 1 point          |
| 8             | The logic of presentation of the report, the persuasiveness of the arguments, originality of thinking | 1 point          |
| 9             | Compliance with the time frame allotted for the presentation: no more than 10 minutes                 | 1 point          |
| 10            | Answers to questions of the seminar participants  | 1 point          |
| <b>Total:</b> |   | <b>10 points</b> |

1. All assessments are set on a 10-point scale as follows:

- 10 - brilliantly
- 9 - excellent
- 8 - almost perfect
- 7 - very well
- 6 - well
- 5 - very satisfactory
- 4 - satisfactory
- 3 - bad
- 2 - very bad
- 1 - unsatisfactory

2. The resulting evaluation of the discipline consists of the evaluation of:

- performance on seminar –  $O_{activity}$
- exam –  $O_{exam}$

3. The resulting estimate of the discipline is determined by the formula:

$$O_{result} = k_1 \cdot O_{activity} + k_2 \cdot O_{exam}$$

Where:

$$k_1 = 0,4$$

$$k_2 = 0,6$$

4. To calculate the resulting assessment using standard rounding rules. However, the estimate of **less than 4 points are not rounded up to 4**. For example, if it is 3.99 points, it means that the student has not passed the point required to obtain a satisfactory evaluation, and he exhibited poor mark a «3» on a scale.

5. Example of calculation of the resulting assessment:

$$O_{activity} = 5$$

$$O_{exam} = 5$$

$$O_{result.} = 0,4 \cdot 6 + 0,6 \cdot 5 = 4,9$$

In view of  $O_{result.} = 5$  points

## **Literature**

### **Core reading**

1. De Palma, André. A Handbook of Transport Economics - Edward Elgar Publishing. ISBN: 978-1-84720-203-1, 978-0-85793-087-3, 978-1-283-33506-5.
2. Transport Economics Research and Policymaking - OECD Publications Centre. ISBN: 978-92-821-1249-6, 978-1-280-03500-5, 978-92-64-17384-2. Transportation. 1999

### **Additional reading**

1. Cascetta, Ennio. Transportation Systems Analysis: Models and Applications (Springer optimization and its applications ; v. 29) - Springer. ISBN: 978-0-387-75856-5, 978-0-387-75857-2.
2. Shiftan, Yoram; Attard, Maria. Sustainable Urban Transport - Emerald Publishing Limited. ISBN: 978-1-78441-616-4, 978-1-78441-615-7.
3. Morichi, Shigeru; Schmidt; Acharya, Surya Raj. Transport Development in Asian Megacities: A New Perspective (Transportation Research, Economics and Policy) – Springer Berlin Heidelberg. ISBN: 978-3-642-29742-7, 978-3-642-43199-9, 978-3-642-29743-4. Business (General).
4. Lo, Hong K; Wong, S. C; Lam, William H. K; Levine. Transportation and Traffic Theory 2009: Golden Jubilee : Papers Selected for Presentation at ISTTT18, a Peer Reviewed Series Since 1959 - Springer. ISBN: 978-1-4419-0819-3, 978-1-4419-0821-6, 978-1-4899-8303-9, 978-1-282-33143-3, 978-1-4419-0820-9. Business (General).

### **Special Equipment and Software Support**

Classrooms must be equipped with projectors for showing lecture slides and demonstrating lab assignments, as well as whiteboard and markers.