

9.5 CE0914 – Transportation Systems Analysis

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE0914	SEMESTER	9
COURSE TITLE	Transportation Systems Analysis		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
	3	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialisation Course		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes, if requested.		
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CIV208/		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>Upon completion of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. To understand the basic concepts related to transport planning and economic analysis of transportation systems. 2. To learn the basic categories of quantitative methods that are used in transportation problems 3. To understand the impact of quantitative methods in the analysis and design of transportation systems 4. To understand and solve problems related to the design of transport systems that require the use of data analysis methods 5. To design and implement surveys in order to investigate the acceptance and use of transport services 6. To design a complete framework for analysing the impact of a transport project.

7. To develop models and evaluate their usefulness and credibility.
8. To become familiar with the use of econometric software packages (ex. SPSS, R), to develop models in order to solve transport problems and evaluate their results.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>

Specifically, students will be able to perform:

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Adapting to new situations
- Decision Making.
- Autonomous work
- Team work
- Working in an international environment
- Project planning and management

(3) SYLLABUS

The objective of the course is the development and use of data analysis methods in transportation problems. The content of the course includes econometric analysis of time series and cross sectional data, discrete choice modelling, design and analysis of questionnaires using revealed and stated preference techniques, cash flow analysis and optimization of transport network. The problems discussed include analysis and forecasting of transport demand, choice of transport mode, acceptance of new transport projects and services, economic analysis of transport infrastructures, and problems of designing transport networks.

- Introduction to Quantitative methods used in the design and analysis of transportation systems.
- Transport demand analysis. Fundamental concepts and parameters for the development and use of transport demand analysis and forecasting models.
- An integrated framework of evaluating and analyzing the impact of transport infrastructures. Economic Efficiency analysis of transportation systems. Cash flow analysis. Cost benefit analysis.
- Applied statistical analysis. Hypothesis testing. Linear Regression. Coefficient of Determination, Assumptions of Linear Regression. Time series analysis and cross sectional data analysis.
- Design of surveys using questionnaires. Revealed and stated preference techniques. Sampling methods.
- Analysis of discrete choice models using statistical and econometric software packages.
- Optimization methods. Optimization of transport networks. Transport and allocation problems.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Teaching using ICT. <ul style="list-style-type: none"> • Blackboard sketches, images and Power Point presentations. • Problem solving using statistical and econometric software packages. • The course’s notes, the project, the exercises, as well as related examples are uploaded on course website.

	Communication with students through email and e-class platform..												
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<table border="1"> <thead> <tr> <th style="text-align: center;"><i>Activity</i></th> <th style="text-align: center;"><i>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Study and analysis of bibliography</td> <td style="text-align: center;">25</td> </tr> <tr> <td>Problem solving</td> <td style="text-align: center;">21</td> </tr> <tr> <td>Preparation of the project</td> <td style="text-align: center;">40</td> </tr> <tr> <td>Course total</td> <td style="text-align: center;">125</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Semester workload</i>	Lectures	39	Study and analysis of bibliography	25	Problem solving	21	Preparation of the project	40	Course total	125
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<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written examination (70%) which includes problem-solving, short answer questions, multiple and open-ended questions. In particular cases the examination is oral.</p> <p>Specifically-defined evaluation criteria are given and they are presented to students before the final written examination. The partial score of each question of the written exam is included in the exam questions paper and the final grade is available to the students through the platform of the university. Students reserve the right to ask the examiner to provide comments on the assessment of their written exam concerning the score of each question and may also ask the examiner to explain their mistakes, if any.</p> <p>Project (30%). Students also submit a written project during the semester and present it to the class. The project is assessed for deriving the final performance score in the course. The evaluation criteria are presented to the students and detailed explanations are given to them.</p> <p>The evaluation language is Greek. For Erasmus students English is the evaluation language.</p>												

(5) ATTACHED BIBLIOGRAPHY

<p><u>Greek Bibliography:</u></p> <ol style="list-style-type: none"> 1. Stathopoulos, A., Karlaftis M. "Design of Transportation Systems", Papasotiriou 2008, ISBN 9789607182050. 2. Πορφυλλίδης, Β."Transport Economics", Papasotiriou 2016. 3. Sabrakos, E. "Introduction to Transport Economics", Stamouli, 2001. <p><u>Foreign Bibliography:</u></p> <ol style="list-style-type: none"> 1. Ortuzar, J.D., Willumsen, L.G. (2011). Modelling Transport, 4th Edition. Willey, New York. 2. Washington, S. P., Karlaftis, M. G., & Mannering, F. L. (2010). Statistical and econometric methods for transportation data analysis. CRC press. <p><u>Related academic journals:</u></p> <ol style="list-style-type: none"> 1. Transportation Research Record 2. Transport Policy 3. Journal of International Transportation 4. European Transportation Research Record 5. Journal of European Transport 6. Journal of Transportation Research Forum 7. Transportation Science 8. Transportation Research: Parts A: Policy and Practice
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9. Transportation Research: Parts B: Methodological
10. Transportation Research: Parts C: Emerging Technologies
11. Transportation Research: Parts D: Transport and Environment
12. Transportation Research: Parts E: Logistics and Transportation Review
13. Transportation Research: Parts F: Traffic Psychology and Behaviour
14. International Journal of Sustainable Transportation
15. Transportation Planning and Technology
16. Transport Reviews
17. Transportation Journal
18. Research in Transportation Business and Management