

Module Title: ADVANCED TRANSPORTATION SYSTEM ANALYSIS

- **Type of Module:**

TE0001	Elective
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- **Level of Module**

Postgraduate

- **Year of Study**

MASTER'S

- **Semester**

Spring Semester 3 rd Semester
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- **Number of credits allocated**

3

- **Name of lecturer / lecturers : Amalia Polydoropoulou**

- **Description:**

The purpose of this course is to introduce students to the field of transportation systems. This course presents the main components of a transportation system. It presents the equilibrium between the supply and demand of a transportation system. It studies passenger and freight transportation and presents methods for their forecasts. It presents all the advanced transportation systems design models with emphasis to the 4-step model, activity models and policy development models. Emphasis is given to innovative data collection methodologies and to decision making and policy making under uncertainty. It analyses the terms of traffic flow, operation design, queuing theory and the transportation system optimization. Finally, it presents the intelligent, safe and green transportation systems. At the end of the course students will be able understand the basic principles of transportation. They can analyze the basic concepts and characteristics of transport systems and they will be able to quantify the interaction of supply and demand in transport. In addition, students at the end of the course will be able to develop mathematical simulation models. Finally, they will understand the concept of sustainable transport through methodologies and research findings related to active movement, road safety, and the use of advanced information systems, etc. and will be able to evaluate transportation policies.

- **Prerequisites:**

N/A

Module Contents (Syllabus):

This course analyses the main components of a transportation system. It presents the equilibrium between the supply and demand of a transportation system. It studies passenger and freight transportation and presents methods for their forecasts. It presents all the advanced transportation systems design models with emphasis to the 4-step model, activity models and policy development models. Emphasis is given to innovative data collection methodologies and to decision making and policy making under uncertainty. It analyses the terms of traffic flow, operation design, queuing theory and the transportation system optimization. Finally, it presents the intelligent, safe and green transportation systems.

Language of instruction / Γλώσσα διδασκαλίας

Greek

Name and contact info of lecturer / Στοιχεία διδάσκοντα

Name: Amalia Polydoropoulou, Professor

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Expected learning outcomes / Μαθησιακοί στόχοι

AIMS OF THE COURSE

The Advance Transportation Systems Analysis course aims at :

- Understanding the terminology (in Greek and English), the basic concepts and characteristics of the transport systems .
- To provide the basis for the study and critical analysis of the issues related to passenger and freight transport.
- To provide skills for developing econometric models that can be applied to the transport sector, and to teach students innovative data collection methodologies.
- To contribute to the analytic and synthetic ability of students.

LEARNING OUTCOMES

At the end of lectures students should be able:

- To understand and analyze the characteristics of transport system .
- To conduct literature review on a specific subject and to make a critical analysis.
- To quantify the relationship between supply and demand in transport.
- To simulate transport through mathematical models (using different types of software).
- To understand the concepts of green, safe and intelligent transport systems.
- To analyze and recommend policies related to transport.

Mode of delivery and teaching methods / Είδος μαθήματος και διδακτική μέθοδος

1. Lectures with presentation with powerpoint through video projector
2. Student learning support through e-class.
3. Use of the equipment and software of the Laboratory of Transportation and Decision Making.
4. The course is based on the participation of students during classes. Due to the wide range of topics taught in the lectures presence in class is necessary.

Compulsory & recommended reading / Υποχρεωτική & Συνιστώμενη βιβλιογραφία

A) Compulsory Reading:

- Sussman, J., (2003), *Introduction to Transportation Systems*, Εκδόσεις Σταμούλη, Αθήνα.
- Stathopoulos, A. (2008) *Transportation System Designs*, Papasotiriou Editions, Athens, Greece.

B) Recommended Reading:

1. TRB Executive Committee. “Critical Issues in Transportation» TR News 217 Nov-Dec 2001.
 2. J.S. Sussman. “Educating the New Transportation Professional”. 2
 3. H.H. Topp. “Traffic 2042 – mosaic of a vision.” *Transport Policy* 9, 2002.
 4. M. Watch. “A different kind of vision: a comment on Hartmut’s Topp “Traffic 2042 – mosaic of a vision.”” *Transport Policy* 9, 2002.
 5. Ben-Akiva M. and S. Lerman. “Discrete Choice Models.” MIT Press, 1985.
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6. Manheim, M. “Chapter 1: The Challenge of Transportation Systems Analysis.” Fundamentals of Transportation Systems Analysis. Cambridge MIT Press. (1979)

Additional course material- chapters from books and scientific journals- are uploaded in e-class by the lecturer. In addition, students can access all the course materials and lecture presentations from the e-class platform
<http://eclass.chios.aegean.gr/courses/STT170/>.

Assessment methods & criteria / Μέθοδος & κριτήρια αξιολόγηση

Students are asked to submit a compulsory project and they pass through an oral examination. The overall rating of the course is as follows:

i. Project: (70% of the final grade)

Students are asked to choose among one of the critical issues in transportation, find the relevant literature, describe the existing situation in Greece and compare it with the other countries.

ii. Presentation and oral examination: (30% of the final grade)

Students are asked to present their projects and they are examined on their understanding the materials presented during the lectures.
