

DIM-OPT-622 Sustainable Transportation Systems

SEMESTER: Spring
CREDITS: 3 ECTS (2 hrs. per week)
LANGUAGE: English
DEGREES: MII, SAPIENS program

Course overview

This course is an introduction to transportation systems, focusing on sustainability point of view. The application of sustainability indicators to transportation systems is performed, which allows assessing the impact of transportation on environment and the feasibility of transportation projects for cities. Also power train technologies and passengers and goods transportation alternatives are revised.

Prerequisites

There are not any prerequisites needed to study the subject. However, basic Energy Engineering knowledge will be a good asset.

Course contents

Theory:

1. Introduction to sustainability transportation. Definitions. Functions and Factors. Social Impact. Transportation models and classification: Road, train, vessels, airplanes. History. Transportation Engineering.
2. Sustainable development. What is sustainability?. Processes and indicators. Life cycle analysis: from well to wheel.
3. The CO₂ problem. The greenhouse effect. Engine combustion with conventional fuels. Basic equations.
4. Sustainable driving. Driver's role. Technology role.
5. Non-conventional fuels as an alternative. Bio-fuels. LPG. CNG. Hydrogen.
6. Non-conventional vehicles. Hybrid. Electric.
7. Specific transportation programs. PMUS (In City). PPT (To working place). Car Pooling. Car Sharing.

Textbook

- Available slides at Moodle.

- Collections of articles
- White Book of 2015 transportation (EU)
- Green Book 2012 transportation (EPA)

Grading

The overall grade is obtained as follows:

- Final exam 50%.
- Continuous evaluation 50%. This includes homework and case solving and team work presentations.