

Ciências ULisboa

Faculdade
de Ciências
da Universidade
de Lisboa

Eng. Energy & Environment

move ▶ green



Sustainable Mobility

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Theory & practice

Monday 14h-16h Recorded class

Wednesday 16h30-17h ZOOM doubts
17h-18h00 Recorded class

- 3 assignments (mandatory);
- oral (about the assignments and sustainable mobility contents).
 - Last week, day 16 December
 - 1st date exam
 - 2nd date exam

OVERALL 3 oral chances

Program

Topics	#	Contents
Basic concepts and definitions	1	Transportation system; Transports classification; historical evolution;
	2	Introduction to “sustainability and metrics”
	3	Energy conversions, primary energy, final energy, useful energy; Minimum energy and emissions in mobility,
	4	Propulsion technologies, internal combustion engines, electric motors, fuel cells, efficiencies
Characterization of mobility patterns	5	Surveys; Statistics; transport sector share energy & emissions;
Sustainability – Environmental dimension	6	Development of “sustainability and Metrics”
Air quality	7	World Health Organization, Directives, standards for emissions, air quality index
	8	Air quality networks and pollutants covered - local and global emissions
Emission inventories	9	Emission inventory models, micro to macro, motor vehicle dynamics
	10	COPERT 5 fleet model

Program

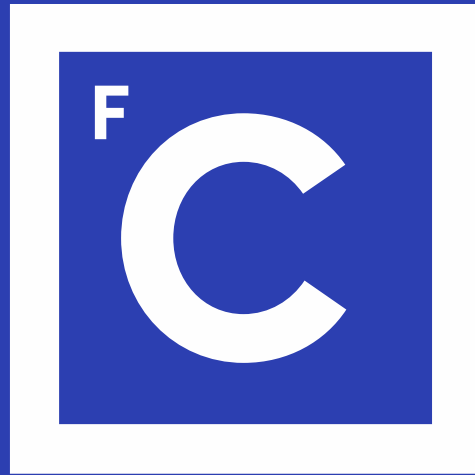
Topics	#	Contents
Application of metrics of Sustainable mobility	11	Comparing Lisbon and Oporto mobility Screening mobility patterns in University campus
Life cycle analysis in transportation systems	12	Life cycle analysis
	13	Water, land use, resources scarcity and carbon footprint
	14	Carbon footprint in transport
	15	Carbon footprint applied to electric versus diesel technology
Disruptions & consequences	16	COVID19 impact overview

- ✓ **Know the contribution of the transport sector for energy consumption of fossil and renewable origin and know its contribution to emissions;**
- ✓ **Distinguish between local and global emissions;**
- ✓ **Know typical values of energy consumption MJ/(p.km) and emissions g/(p.km); know how to design a survey about mobility patterns;**
- ✓ **Know the different technologies available and its share in the fleets;**
- ✓ **Know how to do an emission inventory;**
- ✓ **Know how to analyze scenarios and impacts on energy and emissions;**
- ✓ **Compare different transport system in a life cycle perspective;**
- ✓ **Estimate carbon footprints.**

- 1. Black, W. R. Sustainable Transportation: Problems and Solutions. 2010. The Guilford Press.**
- 2. Harvey, L. D. Danny . Energy Efficiency and the Demand for Energy Services. Chapter 5. 2010. Earthscan.**
3. EU Energy, Transport and GHG emissions trends to 2050. European Commission. 2013.
- 4. EMEP/EEA air pollutant emission inventory guidebook – 2013. European Environment Agency.**
5. John Heywood. Internal Combustion Engine Fundamentals. 1988. McGraw-Hill.
6. Larminie, J. and Lowry, J. Electric Vehicle Technology Explained. 2012. Wiley.
7. M.K. Gajendra Babu, K.A. Subramanian Alternative Transportation Fuels: Utilisation in Combustion Engines. 2013. CRC Press.

What is sustainable mobility?

Thanks



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