Course guide
240EI023 - 240EI023 - Transport

Last modified: 13/03/2025

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Compulsory subject).
MASTER'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2019). (Optional subject).

Academic year: 2025 **ECTS Credits:** 4.5 **Languages:** Catalan

LECTURER

Coordinating lecturer: Mª Antonia de los Santos López

Others: Primer quadrimestre:
NATHALIE LLORCA
RAQUEL FERRER ARIZON
LAIA FERRER MARTI
M. ANTONIA DE LOS SANTOS LOPEZ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMEI21. Knowledge on transport and industrial maintenance methodologies and techniques.

Basic:
CB 9. (ENG) Que els estudiants sàpiguen comunicar les seves conclusions i coneixements (i darrers raonaments que els sostentin), a públics especialitzats i no especialitzats de manera clara i sense ambigüitats.
CB10. (ENG) Que els estudiants poseeixin les habilitats d'aprenentatge qur els permetin continuar estudiant d'una manera d'una forma que haurà de ser en gran mesura autodirigit o autonònom

TEACHING METHODOLOGY

The teaching methodology is based on two types of activities. Classes in which the teacher provides concepts and knowledge and, through practical exercises, illustrates how to apply the knowledge presented to the resolution of real situations and problems; in most sessions exercises are proposed for the students to develop in class with the support of the teacher. Practices in small groups in which students carry out activities under the supervision of a teacher. In the practicals you learn to use simulation tools and the students learn based on a chosen real problem. The work is done in groups and they must deliver a written report on the models used and an oral defense. In practice and at work, generic skills such as teamwork, oral and written skills, among others, are worked on.

LEARNING OBJECTIVES OF THE SUBJECT

Ensure that students acquire knowledge about the systems freight, passenger transport and internal transport. This knowledge should allow them to solve basic problems in these areas using simple algorithms and simulation tools.

STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	24.00
Hours small group	13,5	12.00
Self study	72,0	64.00

Total learning time: 112.5 h

CONTENTS

Methods of analysis of transport systems

Description:
Presentation of models and procedures to analyze different aspects of transport systems such as impact, cost, time, etc.

Specific objectives:
Know the models and procedures for analyzing different aspects of transport systems.

Related activities:
Application of analysis methods to different transport systems.

Related competencies :
CEMEI21. Knowledge on transport and industrial maintenance methodologies and techniques.
CB10. (ENG) Que els estudiants poseeixin les habilitats d'aprenentatge qur els permetin continuar estudiant d'una manera d'una forma que haurà de ser en gran mesura autodirigit o autonònom
CB 9. (ENG) Que els estudiants sàpiguen comunicar les seves conclusions i coneixements (i darrers raonaments que els sostentin), a públics especialitzats i no especialitzats de manera clara i sense ambigüitats.

Full-or-part-time: 13h 50m
Theory classes: 2h
Laboratory classes: 3h
Self study : 8h 50m

Internal transport

Description:
Presentation of internal storage and transport systems. Presentation of design procedures, analysis and simulation of these systems.

Specific objectives:
Know the characteristics of the most common systems used in internal storage and transport. Be able to design, analyze and simulate internal transport systems for simple cases.

Related activities:
Design, analysis and simulation exercises of internal transport systems for simple installations.

Full-or-part-time: 13h 50m
Theory classes: 2h
Laboratory classes: 3h
Self study : 8h 50m

Freight transport

Description:
Presentation of various freight transport problems, their mathematical formulation and heuristic procedures to solve them.

Specific objectives:
Understanding different types of freight problems. Learn to identify types of problems. Applying the algorithms to solve each problem.

Related activities:
Solving different types of problems freight using appropriate algorithms for their resolution.

Full-or-part-time: 48h 40m
Theory classes: 14h 30m
Laboratory classes: 3h
Self study : 31h 10m

Passenger transportation

Description:
Presentation of various passenger transport problems and the procedures to solve them.

Specific objectives:
Know problems of passenger transport and apply procedures for their resolution.

Related activities:
Solving passenger transport problems using the procedures presented.

Full-or-part-time: 36h 10m
Theory classes: 10h
Laboratory classes: 3h
Self study : 23h 10m

GRADING SYSTEM

The qualification is based on three types of assessment acts: a midterm test, a final exam and the evaluation of the work. Theoretical and practical lessons are assessed both in the partial test and in the final exam. The work evaluates the theoretical and practical content as well as the ability to solve real problems . In order to have a grade for the work, it is mandatory to deliver the requested documentation and make the oral defense.
The final mark is: Nfinal = 0.3NEP+Max[0.7NEF; 0.5NEF+0.2NPP]
with: NEP: practice mark. NEF: final exam mark; NPP: mark of the midterm test.
The mark of the reassessment exam will replace the mark of the final exam and the midterm exam. The maximum mark for the reassessment exam will be a 5. In this case, the final mark is:
Nfinal = 0.3NEP+ 0.7NER
with NER: reassessment exam grade
NEP: The practice mark will evaluate a practice project, carried out in group, and its presentation and defense. Attendance at the sessions of project definition, presentation and defense is mandatory, and attendance at the other sessions will also be assessed.

EXAMINATION RULES.

You will be informed of the test rules on the subject's virtual campus.

BIBLIOGRAPHY

Basic:
- Hall, R. W., ed. Handbook of Transportation science [on line]. 2nd ed. Boston [etc.]: Kluwer Academic, cop. 2003 [Consultation: 19/09/2022]. Available on: https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/b101877. ISBN 1402072465.
- Izquierdo, Rafael. Transportes : un enfoque integral. 2a ed. Madrid: Colegio de Ingenieros de Caminos, Canales y Puertos, 2001. ISBN 843800198X.
- Morlok, Edward K. Introduction to transportation engineering and planning. New York: McGraw-Hill, 1978. ISBN 0070431329.
- Papacostas, C. S ; Prevedouros , P. D. Transportation engineering and planning. 3rd ed. Upper Saddler River: Prentice Hall, 2001. ISBN 0130814199.
- Ortúzar S., Juan de Dios; Willumsen, Luis G. Modelling transport [on line]. 4th ed. Chichester: John Wiley & Sons, 2011 [Consultation: 03/11/2025]. Available on: https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/9781119993308. ISBN 9780470760390.
- Robusté, Francesc. Planificació i gestió del Transport en el territori : Màster en Enginyeria de Camins, Canals i Ports : Transparències assignatura. Barcelona: ETSCCPB, 2014.