66429 - Advanced vehicle design

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	536 - Master's in Mechanical Engineering
ECTS	4.5
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process that has been designed for this course is based on the following: the methodology proposed seeks to promote continuous student working and focuses on more practical aspects of the calculation and optimization of advanced automotive systems.

Sessions with the entire group cover theoretical and descriptive aspects of the systems studied in the form of master class and also explains design criteria, calculation procedures and examples of solved cases corresponding to different vehicle systems treated in the course.

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In practical classes, vehicle bodies are designed and optimized and their components, as well as thermal and hybrid engines of vehicles through the handling of numerical and experimental techniques. Real design variables are handled.

The evaluation focuses on the practical aspects of design and calculation of the systems studied, although a description is initially required to adequately meet these systems. The criteria used in the evaluation process are explained in this guide.

5.2.Learning activities

The course is articulated in 22.5 classroom hours, along 15 weeks in the semester. In them, the full group of students is given the description of the vehicle systems studied. It is also explained the design, calculation and applicable test procedures and some case studies. Another 22.5 hours are taught in small groups, in computer or experimental laboratory, to develop skills in solving real problems and interpretation of results. Complete information regarding the realization of laboratory practices will be shown on the website of the Centre or on the subject website.

5.3.Program

The program offered to the student, to achieve the intended results, includes the following activities:

No. hours

A 01 Masterclass 10

A 02 Resolution of problems and cases 12.5

A 03 Laboratory practices 20

A 04 Special practices 2.5

A 05 Applied or practical works 35

A 06 Mentored research work 5

A 07 Theory study 55

A 08 Evaluation tests 2.5

Contents are divided in the following learning modules:

Module 1: Alternative Internal Combustion Engines

Module 2: Electric and hybrid power plans

Module 3: Design of vehicle bodies

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5.4.Planning and scheduling

Calendar of classroom sessions and work presentations

The subject schedule, both in the face-to-face classroom sessions and lab sessions, shall be determined by the academic calendar that the center establishes for the corresponding academic year. The schedule for submission of works will be conveniently announced at the beginning of the course.

5.5.Bibliography and recomended resources

Basic Bibliography:.

1. MUÑOZ, M.; MORENO, F. y MOREA, J. *Motores alternativos de combustión interna* . Prensas universitarias de Zaragoza. 1999.
2. HEYWOOD, J. *Internal combustion engine fundamentals.* McGraw-Hill. 1988.
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4. PAYRI, F. y DESANTES, J.M. *Motores de combustión interna alternativos* . Editorial Reverté y UPV. 2011.
5. GIACOSA, D. *Motores endotérmicos.* Omega. 1988.
6. STONE. R. *Introduction to internal combustion engines.* SAE. 1992.

Complementary bibliography:.

1. TAYLOR, C. *The internal combustion engine in theory and practice.* The MIT Press. 1985.
2. LILLY, L. *Diesel engine reference book.* Butterworths, 1986.
3. FERGUSON, C. R. *Internal Combustion Engines* . John Wiley & Sons. 1985.
4. FERRARI, G. *Motori alternativi.* Dipartimento di Energetica. Politecnico di Milano.
5. GUIBET, J. *Carburants et moteurs.* Vol. 2. Éditions Technip. 1987.
6. SCHILLING. A. Los aceites para motores y la lubricación de los motores. Interciencia. 1965.
7. WATSON, N. y M. S. JANOTA. Turbocharging the internal combustion engine. The Macmillan Press. 1982.
8. HEISLER, H. Advanced engine technology. Edward Arnold. 1995.

Other bibliography:

1) "Electric and Hybrid Vehicles. Design Fundamentals". Iqbal Husain. CRC PRESS 2003.

2) "Propulsion Systems for Hybrid Vehicles". John M. Miller. THE INSTITUTION OF ENGINEERING AND TECHNOLOGY. 2004.

3) "Electric Vehicle technology Explained". James larminie / John Lowry. WILEY 2003.

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4) "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles". Mehrdad Ehsani, Yimin Gao, Sebastien E. Gay, Ali Emadi. CRC PRESS 2005.

5) "Spanish Capabilities in the Eco-electro Road Mobility Sector and the FP7 Green Cars Initiative". TECNOEBRO-CDTI-SERNAUTO 2009.