

## Course Unit Description - (SIAUT)

(Automotive Systems)

(Mestrado em Engenharia Electrotécnica e de Computadores)

Academic year: 2009/2010



### Subject group: Ciências Básicas da Electrotecnia

	Semestral	Optional		
<b>Mode of study</b>	Diurno	<b>Hours/Week</b>	T-Teórica	2
<b>Year</b>	1 <sup>o</sup>		PL-Prática-Laboratorial	2
<b>Semester</b>	1 <sup>o</sup>		OT-Orientação Tutorial	1
<b>ECTS</b>				6

### Objectives

The course mostly addresses technological issues related to automotive systems, particularly on the electrical and electronic areas.

Students should have previous background in electrical and computer engineering, namely in the following areas:

- electrical and electronic systems
- electrical machinery
- instrumentation and control chain (sensors, A/D converters, etc.)
- microcontrollers/microprocessors
- computer architectures, embedded and distributed systems

### Course Contents

1. Basic operation of the internal combustion engine
2. Starting Systems
3. Charging systems
4. Ignition Systems
5. Fuel Injection Systems
6. Glow Plug Pre-Heating Systems
7. Electrical and Hybrid Vehicles
8. Other automotive systems

### Recommended reading

Ronald Jurgen, Automotive Electronics Handbook, Second Edition, 1999, McGraw-Hill, ISBN 0-07-034453-1.  
Bosch, Automotive Handbook, Fifth Edition, Robert Bosch GmbH, distributed by SAE – Society of Automotive Engineers, 2000, ISBN 0-7680-0669-4.  
Peter Wright, Formula 1 Technology, SAE – Society of Automotive Engineers, 2001, ISBN 0-7680-0234-6.  
William Ribbens, Understanding Automotive Electronics, Sixth Edition, SAE – Society of Automotive Engineers, Elsevier Science, 2003, ISBN 0-7680-1221-X.  
James Larminie, Andrew Dicks, Fuel Cell Systems Explained, Second Edition, Wiley, 2003, ISBN 0-470-84857-X.  
Chris Johanson, Auto Engine Performance and Driveability, The Goodheart-Willcox Company, Inc., 1998, ISBN 1-56637-369-7.  
Ian Moir, Allan Seabridge, Aircraft Systems, Longman Scientific and Technical, 1992, ISBN 0-582-07223-9.  
E. Pallet, Aircraft Instruments and Integrated Systems, Addison Wesley Longman, 1996, ISBN 0-582-08627-2.  
Tom Denton, Automobile Electrical and Electronic Systems, Second Edition, SAE – Society of Automotive Engineers, 2001, ISBN 0-340-73195-8.  
M. Vicente, A Electrónica no Automóvel, Plátano Editora, 1990, ISBN 972-707-012-4.  
M. Castro, Manual do Alternador, Bateria e Motor de Arranque, Plátano Edições Técnicas, Portugal, 1991, ISBN 972-707-049-3.  
M. Castro, Manual da Ignição, Plátano Edições Técnicas, Portugal, 1989, ISBN 972-707-027-2.  
A. Tranter, Manual de Electricidade das Motos, Edições CETOP, Portugal, 1995, ISBN 972-641-325-7.  
H. Chollet, Mecânicos de Automóveis - O Motor e Seus Acessórios, Hemus Editora, Brasil, 1996, ISBN 85-289-0036-3.  
H. Chollet, Mecânicos de Automóveis - O Veículo e Seus Componentes, Hemus Editora, Brasil, 1997, ISBN 85-289-0037-1.  
D. Westgate, A Electricidade no Automóvel, Hemus Editora, Brasil, 1997, ISBN 85-289-0017-7.  
Bosch, Automotive Electrical/Electronic Systems, 1988.  
Seleções do Reader's Digest, O Livro do Automóvel, Seleções do Reader's Digest, Portugal, 1976, ISBN 85-289-0017-7.  
Renault, Tecnologia Automóvel, Manual.  
Mitsubishi, M-STEP Electrical Trainee's Textbook.  
Mitsubishi, M-STEP MPI – Manual de Formação.  
Toyota, Electronics Module &#61482; &#61478;  
Toyota, Manual 4A-FE, 1993.  
Toyota, Manual 2C, 1993.  
Guiões TCCS, Toyota/Salvador Caetano, 1993.  
SAE - Society of Automotive Engineers journals.

Some relevant material is available at:

[http://www.dee.isep.ipp.pt/~mjf/act\\_lect/SIAUT/SIAUT.html](http://www.dee.isep.ipp.pt/~mjf/act_lect/SIAUT/SIAUT.html)

### Teaching Methods

The course is constituted by an important set of practical experiments (around 30 hours) in the "Laboratório Automóvel" of ISEP, covering most of the aspects referred in the Course Contents.

Additionally, a diverse set of keynote talks is organized, from speakers featuring different professional skills, namely on Mechanical Engineering and enterprise expertise.

For further information on this course, refer to:

[http://www.dee.isep.ipp.pt/~mjf/act\\_lect/SIAUT/SIAUT.html](http://www.dee.isep.ipp.pt/~mjf/act_lect/SIAUT/SIAUT.html)

### Assessment methods

Assessment is based on two components:

- a research work developed along the semester representing 75% of the final grade (15 in 20); written report and oral presentation/defense will be considered;
- assessment of the student performance along the semester, representing 25% of the final grade (5 in 20).

The latter is determined from the following components:

- level of participation and performance during the classes (1 in 20);
- classification of an individual examination session at the end of the semester (4 in 20);

	<b>Name</b>
<b>Teacher responsible:</b>	Mário Jorge de Andrade Ferreira Alves (MJF)
<b>Lecturer:</b>	Mário Jorge de Andrade Ferreira Alves (MJF)