

Syllabus

Course description

Course title	Industrial Electrical Applications
Course code	42156
Scientific sector	ING-IND/32
Degree	Industrial Mechanical Engineering (L-9)
Semester	1
Year	3
Academic year	2018/2019
Credits	6
Modular	No

Total lecturing hours	36
Total lab hours	-
Total exercise hours	24
Attendance	
Prerequisites	Electrotechnics
Course page	To define

Specific educational objectives	<p>The course provides the most significant elements on the applications of electrical engineering. Electrical machines, components and equipment are analyzed also dealing with the related safety issues. Energy efficiency in industry (e.g. applied to automation) will be one of the focuses of the course, together with its implications in terms of design choices. Economic benefits and costs will be also considered, e.g. by means of case-studies.</p> <p>A comprehensive view on the state-of-the-art and innovative applications will be also proposed, aiming at providing a wide range of design tools and choice criteria.</p>
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Module 1	
Lecturer	t.b.d.
Scientific sector of the lecturer	ING-IND/32
Teaching language	English
Office hours	t.b.d.
Teaching assistant (<i>if any</i>)	t.b.d.
Office hours	t.b.d.
List of topics covered	<p>The course covers the topics of electrical power generation, distribution, conversion and use from a system-level point of view, with a specific focus on industrial applications. The main topics are as follows:</p> <ul style="list-style-type: none"> • Fundamental of industrial controllers (microprocessors and PLC)

	<ul style="list-style-type: none"> • main applications and operation of electrical machinery • electrical power system organization and operation • design and study cases of the introduced topics • practical work in lab with Arduino and derived projects
Teaching format	Frontal lectures, exercises, practical lab sessions.
Learning outcomes	<p>Knowledge and understanding: Master the most important concepts about industrial electrical applications, understand the design principles of electrical equipment and installations.</p> <p>Applying Knowledge and understanding: Using proper criteria and tools for designing or choosing electrical systems and devices. The elements learnt are applied to real-world case-studies.</p> <p>Making judgments: Ability to select the more adequate electrical system for a certain industrial application.</p> <p>Communication skills: Acquisition of the field-related technical terminology. Ability to describe the state-of-the-art of the technology adopted in electrical industrial systems.</p> <p>Learning skills: Ability to learn autonomously is improved by acquiring analytical approaches, inter-disciplinary skills and by reading and understanding scientific and technical documentation.</p>
Assessment	The assessment of the course is by written and oral exam. Written exam comprises numerical exercises. The oral exam aim to test the ability to use and transfer the acquired knowledge. During the oral exam, the practical lab sessions will be discussed to check the mastering of the topics covered.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Final mark. Relevant for assessment: clarity of answers, mastery of language (also with respect to the teaching language), ability to summarize, evaluate, and establish relationships between topics, skills in critical thinking, ability to summarize and make judgments.
Required readings	There is no single textbook covering the entire course content. The material is collected from various sources, which will be announced during the course.
Supplementary readings	<ol style="list-style-type: none"> 1. Chitarin, G.; Gnesotto, F.; Guarnieri, M.; Maschi, A. & Stella, A. Elettrotecnica 2 Applicazioni Esculapio, 2018 Fauri, Gnesotto, Marchesi, Maschio, "Lezioni di Elettrotecnica – Applicazioni elettriche", Editrice Esculapio, Bologna, ristampa 2008 2. Hughes, A. Electric motor and drives, Elsevier, 1990