

Antonio Ometto

<b>Programme of “Sistemi elettrici per la mobilità” “Electric Systems for Mobility”</b>		
I0379, Compulsory, 2 <sup>nd</sup> cycle in Electrical Engineering, 2 <sup>nd</sup> year, 2 <sup>nd</sup> semester		
Number of ECTS credits: 9 (workload is 225 hours; 1 credit = 25 hours)		
Teacher: <i>Antonio Ometto</i>		
1	<b>Course objectives</b>	The goal of this course is to provide specific knowledge on: <ul style="list-style-type: none"><li>- electric railway systems from the point of view of both power supply and on board equipment;</li><li>- pure and hybrid electric vehicles.</li></ul>
2	<b>Course content and Learning outcomes</b>	Topics of the module include: <ul style="list-style-type: none"><li>- <b>General aspects of traction system:</b> technical aspects of railway electrification; train dynamics and speed-time characteristics.</li><li>- <b>Traction motors and drives:</b> DC and AC collector motors, AC motors, single-phase drives; chopper drives; inverter drives. Principles of powering and regenerative braking; blended regenerative and rheostatic brake control.</li><li>- <b>AC and DC railways:</b> 50 Hz/DC, 3 phase/single phase 50 Hz and 16 2/3 Hz railway power substations: power quality issues; impact to traction system and public; electrical parameters of traction systems and voltage drop. The 2x25 kV traction system.</li><li>- <b>Electric and hybrid vehicles:</b> introduction to electric vehicles (EVs); EV configurations; motor drives; energy storage systems; hybrid electric vehicles (HEVs): types and operating modes.</li></ul> On successful completion of this module, the student should <ul style="list-style-type: none"><li>- have knowledge and understanding of both previous and present traction systems and drives.</li><li>- have knowledge and understanding of electric vehicles and of the main architectures of hybrid propulsion systems for vehicles.</li></ul>
3	<b>Prerequisites and learning activities</b>	The student must know notions of electrical machines, power electronics and electrical power systems.
4	<b>Teaching methods and language</b>	Lectures. Language: Italian  Ref. Text books <ul style="list-style-type: none"><li>- F. Perticaroli - <b>Sistemi elettrici per i trasporti</b>, Ambrosiana, Milano 2001</li><li>- Lecture notes by the teacher</li></ul>
5	<b>Assessment methods and criteria</b>	Oral exam.