

Programme of “Azionamenti Elettrici”: “Electrical Drives”		
<ul style="list-style-type: none"> <li>• Code: I2L036</li> <li>• <b>Compulsory</b></li> <li>• 2<sup>nd</sup> cycle in Electrical Engineering, 1<sup>st</sup> year, 2<sup>nd</sup> semester</li> </ul>		
Number of ECTS credits: 9 (workload is 225 hours; 1 credit = 25hours)		
Teacher: Francesco Parasiliti Collazzo		
1	<b>Course objectives</b>	The goal of this course is to provide principles of theory and control of the main Electrical Drives.
2	<b>Course content and Learning outcomes (Dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• <b>Introduction to adjustable speed drives.</b></li> <li>• <b>Steady state Electrical Machines models: DC Motors, Induction Motors, Synchronous Motors.</b></li> <li>• <b>Stationary and rotating reference models.</b></li> <li>• <b>DC Motor speed control and multi-quadrant operation. Separately excited DC Motors: armature voltage control, armature current control, field control.</b></li> <li>• <b>Induction Motor speed control: variable voltage, constant voltage/frequency control, current control, flux weakening operation, vector control.</b></li> <li>• <b>Synchronous Motor, Permanent Magnet Motor, Reluctance Motor speed vector control.</b></li> <li>• <b>DC Converters: rectifier and chopper.</b></li> <li>• <b>DC Motor Drives: single and multi-quadrant drives.</b></li> <li>• <b>AC Converter: voltage source inverter. Six-step inverter and PWM inverter, modulation techniques, current control.</b></li> <li>• <b>Speed control AC Motor Drives: voltage/frequency control and field-oriented control.</b></li> <li>• <b>AC Motor operation with non-sinusoidal supply waveforms.</b></li> </ul> <p>On successful completion of this module, the student should</p> <ul style="list-style-type: none"> <li>- have <b>knowledge and understanding</b> of the theory and control of the main Electrical Drives</li> <li>- <b>understand and explain</b> the physical mechanisms of the Electrical Drives and the principles of the electrical motor speed control</li> <li>- <b>demonstrate skill and ability</b> in the choice, design and operation of Electrical Drives and their applications</li> <li>- demonstrate <b>capacity</b> for reading and understand other texts on related topics.</li> </ul>
3	<b>Prerequisites and learning activities</b>	The student must know the contents of the course “ <b>Electrotechnics</b> ”, “ <b>Electrical Machines</b> ”
4	<b>Teaching methods and language</b>	<p><b>Lectures and practical lab experiences, home work</b></p> <p><b>Language:</b> Italian</p> <p><b>Ref. Text books:</b></p> <p>Lectures Notes;</p> <p>G. K. Dubey, Power Semiconductor Controlled Drives, Prentice-Hall International Editions;;</p> <p>J.M.D. Murphy, F.G. Turnbull, Power Electronic Control of AC Motors, Pergamon Press; W. Leonahrd, Control of Electrical Drives, Springer-Verlag; P. Vas, Vector Control of AC Machines, Oxford Science Publications.</p>
5	<b>Assessment methods and criteria</b>	<b>oral exam</b>