Programme of "Elettronica Industriale di Potenza" "Power Electronics":		
Number of ECTS credits: 9 (workload is 225 hours; 1 credit = 25 hours)		
I0743, Compulsory 2nd Cycle in Electrical Engineering, 1st year , 1st semester Teacher: **Nicola Rotondale**		
1	**Course objectives and Learning outcomes**	The goal of this course is to introduce the students to the power conversion systems. On successful completion of this module, the student should be able to know the fundamental principles of power conversion, the operation of the converters, the design criteria and their possible applications.
2	**Dublin descriptors**	Topics of the module include: **Ac voltage controllers:** single phase, three phase **Line commutated converters:** uncontrolled, controlled and semicontrolled rectifiers. Direction of power flow-inverted operation. Commutation and overlap. Voltage and current ripples on the dc side. Three-phase dual converters **Transformers for converters:** connections, power rating, harmonics line current on ac side, power factor, THD. **Chopper:** step-down and step-up operation, two/four quadrant chopper **Resonant pulse converters:** series and series-parallel resonant inverter **Inverter:** single-phase and three-phase bridge, PWM and SPWM modulation, advanced modulation techniques **Power supplies**: buck, boost, buck-boost regulators, full bridge converter On successful completion of this module, the student should - have profound **knowledge** of the converters operation, - have **knowledge and understanding** of the topics, - **understand and explain** the design criteria; - **understand** the concepts of Power Electronics and be aware of their applications in the fields of engineering, - **demonstrate skill** in mathematical reasoning and **ability** to conceive a project, - demonstrate **capacity** for reading and understand other texts on related topics.
3	**Prerequisites and learning activities**	The student must know the electric circuits,, the electronic and electrical machines contained in the exams Electrotechnic, Electronic and Electrical Machines, offered in he 1st cycle of Industrial Engineering.
4	**Teaching methods and language**	Lectures and exercises. Language: Italian **Ref. Text books** Muhammad H. Rashid, **Power Electronics**, Prentice Hall international, 1993 Italian translation: ***Elettronica di Potenza vol. 1 e 2***, Pearson Prentice Hall, Ed. 2007 Mohan, Undeland, Robbins, **Power Electronics,** John Wiley & Sons, 1989 Italian translation: ***Elettronica di Potenza***, Hoepli, Ed. 2003 Didactic Material avalaible by the teacher
5	**Assessment methods**	Oral exam.