EOLIENNES

WIND TURBINES

Lecturers: **Eric VAGNON, Pierre DUQUESNE**

| Lecturers : 10.0 | TC : 10.0 | PW : 4.0 | Autonomy : 6.0 | Study : 2.0 | Project : 0.0 | Language : FR

Objectives

While the electrical energy production is more and more diversified, the energy from wind is a rising solution. Projects of new plants are numerous. These projects include wide offshore farms as well as low power plants in rural environment or in places where the grid is not present. Wind energy is then a important industrial issue and presents many employment perspectives.
The objective of this course is to present the technologies that are used to convert wind energy into electrical energy. The addressed issues deal with fluid mechanics, electrical engineering and power electronics. The presented technologies are related to power plants from a few kW to several MW. Also the special features of

Keywords : Wind, Wind turbine, Fluid mechanics, Electrical Engineering, Power Electronics

Programme	- Possible energy recover from wind energy - Blade aerodynamics - Aerodynamics interactions: installation and site effects - Wind turbine electrical engineering - Power conversion configurations for plants non connected to the grid, connected to the grid offshore - Synchronous generator and dedicated power electronics - Maximum Power Point Tracking Practical works : (4h), Synchronous generator in variable speed operation and power
Learning outcomes	• Describe wind turbine parts and their role. • Explain physical principles used in the conversion from wind energy to mechanical energy and from mechanical energy ort electrical energy.
Independent study	Objectifs : This activity is not concerned with framed autonomy activities outside personal work. Méhodes : This activity is not concerned with framed autonomy activities outside personal work.
Core texts	Bin Wu et al., *POWER CONVERSION AND CONTROL OF WIND ENERGY SYSTEMS.*, Wiley, 2011 Olimpo Anaya-Lara. *WIND ENERGY GENERATION - MODELING AND CONTROL*, Wiley, 2009
Assessment	Final mark = 50% Knowledge + 50% Know-how Knowledge = 100% final exam Know-how = 100% continuous assessment