



SERVIÇO PÚBLICO FEDERAL
UNIVERSIDADE FEDERAL DE PERNAMBUCO
DEPARTAMENTO DE ENGENHARIA MECÂNICA
Pós-Graduação em Engenharia Mecânica UFPE
Área: Sistemas e Processos Térmicos (linha pesquisa Energia Eólica)

Disciplina:

PEM: 994 Tópicos Especiais em Energia IV - (WT Power, Energy, and Torque)

Prof. Proponente/Responsável: Prof. Dr. Alex Maurício Araújo

Objetivos / contexto:

Wind Turbines-WT's has to compete with many other energy sources. It is therefore important that they be cost effective. They need to meet any load requirements and produce energy at a minimum cost per dollar of investment. Performance characteristics such as power output versus wind speed or versus rotor angular velocity must be optimized in order to compete with other energy sources. Yearly energy production and its variation with annual wind statistics must be well known. The shaft torque must be known so the shaft can be built with adequate strength and the turbine load properly sized. We shall examine such performance characteristics in this course.

Ementa:

1- Power output from an ideal turbine; 2- Aerodynamics; 3- Power output from practical turbines; 4- Transmission and generator efficiencies; 5- Energy production and capacity factor; 6- Torque at constant speeds; 7- Drive train oscillations; 8- Starting a Darrieus turbine; 9- Turbine shaft power and torque at variable speeds.

Bibliografia Básica:

Powell, W. R.: "An Analytical Expression for the Average Output Power of a Wind Machine," Solar Energy, Vol. 26, No. 1, 1981, pp. 77-80.

Eldridge, F. R.: Wind Machines, 2nd ed., Van Nostrand Reinhold, New York, 1980.

Hutton, D. V.: Applied Mechanical Vibrations, McGraw- Hill, New York, 1981.

Boeing Engineering and Construction: MOD-2 Wind Turbine System Concept and Preliminary Design Report, Vol. II, Detailed Report, DOE/NASA 0002-80/2, NASA CR-159609, July 1979

Mecanismo de Avaliação:

Verificação da participação nas aulas; colaboração efetiva na construção do produto do Curso.

Horário: Terça-feira-16:00h-19:00h / Vagas: 10 (dez).

Local: Sala de aulas do Lab. Fluidos.

Recife - maio - 2017.