Cambridge TECHNICALS

SIEMENS

A Project Approach to Delivery Siemens – wind turbine control

Wind turbines typically use turbine blades that capture wind energy causing then to spin – converting wind into electricity using a generator and suitable electronics. Wind turbines are controlled and maintained using computerised automated control systems.

Siemens is a leading designer, manufacturer, installer and maintainer of renewable energy generation solutions, including on-shore and off-shore wind turbines.

Optimum performance from the wind turbine is achieved when the pitch of the turbine blades is adjusted to match the speed to the wind, and the blades are turned to face into the wind direction.

Siemens require an investigation to be carried out in order to develop a new range of wind turbines. These are to use automated control systems to optimise their operation and performance, and need to be easily maintainable.

The investigation can be achieved through the construction of a scale model of a wind turbine to include developing a suitable control system solution. The scale model can be used to evaluate the performance of the automated control system, and to ensure that the system is maintainable.

Your tasks are to:
- investigate existing wind turbine control technology
- produce a practical solution to build a model wind turbine with associated control system

In order to do this, you will need to:
- investigate suitable control theory
- investigate and apply the required mechanical and electrical elements
- analyse and apply sensors and actuators
- apply interfacing of sensors and actuators to a control system
- develop, program, evaluate and test a control system using an embedded device
- develop, program, evaluate and test a control system using a Programmable Logic Controller (PLC)

You should also:
- investigate and evaluate industrial networking, Human Machine Interfaces (HMI) and expert systems
- develop a maintenance strategy for the model wind turbine

This work can be undertaken as an individual or within a team. If working within a team learners are expected to contribute to each of the areas (and be able to evidence this contribution) in order to gain the experience and knowledge required to successfully complete the Cambridge Technicals Engineering Level 3 (Automation, Systems and Control pathway) units.