

About the Course

This course is directed especially at people involved in wide ranging aspects of wind energy, who would like more background and understanding of turbine technology. It is therefore not much mathematical or highly analytical although it may afford some fresh insights even for experienced wind engineers.

The course is innovative in both content & structure with a balance of theory & practice. The course will address wide aspects of the technology including the general logic of design in the context of cost of energy considering small and large turbines. It will trace the evolution of modern wind technology from back-yard activities in the 1970's to the present state with corporate industrial development of large scale commercial projects. Likely future developments and some more blue-sky possibilities will also be reviewed.

Who Should Attend

Engineers and researchers involved in all the activities around wind farm development on-shore and offshore, including financing, management, project management, safety, grid connection, logistics, installation and commissioning etc., will benefit from attending this course.

Cost

The registration fee for the course will be £3000 plus VAT (UK ONLY) for a minimum of 6 people. For additional persons, it will be £600 plus VAT per person.

Payment

Payments can be made by cheque (made payable to ASRANet Ltd.), cash or bank transfer. Please enquire for details.

Contact

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Innovations in the Design of Wind Turbines

ONLINE

IN-HOUSE COURSE



PROGRAMME SCHEDULE [Timings in BST (GMT+1)]

Day 1

09.00 - 10.30 Lecture 1: Wind technology development – from backyards to national grids
Peter Jamieson

10.30 - 11.00 *Break*

11.00 - 12.30 Lecture 2: Principles of energy extraction, turbine design basics and system solutions
Peter Jamieson

12.30 -13.30 *Lunch*

13.30 – 15.00 Lecture 3: Design in relation to cost of energy
Peter Jamieson

Day 2

09.00 - 10.30 Lecture 4: What drives design? Wind turbine loads and environmental conditions
Peter Jamieson

10.30 - 11.00 *Break*

11.00 - 12.30 Lecture 5: Upscaling of wind turbines and offshore design
Peter Jamieson

12.30 - 13.30 *Lunch*

13.30 - 15.00 Lecture 6: Innovative systems and future technology trends
Peter Jamieson

CV OF LECTURER:

Peter Jamieson

BSc (pure science) Glasgow University

PJ has been a wind energy professional since 1980, responsible for wind turbine development and much involved in the design of the James Howden wind turbines for a 26 MW wind farm erected in California in 1985. As senior principal engineer in Garrad Hassan from 1991 – 2013 he founded their Scottish office and Special Projects Department. and since October 2009 he has been employed as Senior Technology Adviser in the Wind Energy Centre for Doctoral Training of Strathclyde University. He is author of over 40 papers and inventor of 6 patents relating to wind technology. PJ has long been involved in technology evaluations, in the context of company acquisitions, development of new large turbines of commercial manufacturers and also in evaluating innovations of small start-up companies over an international client base. His book “Innovation in Wind Turbine Design” (Wiley, 2011) reflects a career involvement in wind technology evaluation and development.

Content of Lectures

Lecture 1: Wind technology development – from backyards to national grids.

The evolution of modern wind technology from 1980 to present is explained and the basic challenges for design of a modern wind turbine are addressed.

Lecture 2: Principles of energy extraction, turbine design basics and system solutions.

The basics of extracting energy from wind power are explained and the issues that determine blade shape, rotor speed, power control etc. are outlined. The motives for different rotor and drive train solutions are explained

Lecture 3: Design in relation to cost of energy

Efficiency, reliability, maintenance and capital cost all impact on cost of energy. The relative importance of system components in relation to cost of energy is explained. The issue of power rating in relation to rotor diameter is explored and important differences between onshore and offshore design are highlighted. It is clarified that reducing cost of energy does not simply equate to cost reduction of system components.

Lecture 4: What drives design? Wind turbine loads and environmental conditions.

The development of load specification and of standards for wind turbine design is explained and also the challenge to optimise design of a system where most of the value (energy) is accrued in wind speeds below rated wind speed (lowest wind speed at which maximum steady power output is developed) while most design driving loads (costs) are associated with operation around and above rated wind speeds including storm conditions where power production is suspended.

Lecture 5: Upscaling of wind turbines and offshore design.

The trends in upscaling of wind turbines and the limiting factors are explored as a foundation in understanding the design and development of offshore wind technology.

Lecture 6: Innovative systems and future technology trends.

The great diversity in wind turbine design that exists is contrasted with the predominant commercial choices. Emergent future wind technologies including offshore floating systems and airborne systems are reviewed.