ABOUT THE COURSE

Offshore wind development has witnessed a steady growth in the last decade. Floating wind turbines are a promising new technology in the field of offshore wind power development, particularly in deep water. In recent years, significant R&D effort has been spent in conceiving floater designs that are stiff enough to accommodate wind turbines and stable enough to cope with the highly dynamic environments that prevail in deep seas. Concomitantly, great amount of time has also been invested in developing design tools to accurately model and predict the dynamics of coupling wind turbines to floating structures. The course will deal with various aspects for the design and analysis of floating wind turbines including foundation.

WHO SHOULD ATTEND

Engineers and researchers involved in the design of offshore floating wind turbines, Contracts engineers, Wind turbine Installation companies, Team leaders, Conversion Engineers, Project engineers and managers, offshore controls engineers, Safety inspectors will benefit from attending this course. The course is innovative in both content & structure with a careful balance of theory & practice.

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 Us

ASRANet Ltd.
Surrey, UK

W www.ASRANet.co.uk/courses
E info@asranet.co.uk
T +44 (0)7764575990
General enquiries: +44 (0)7764575990
Payment enquiries: +44 (0) 7712731566

ONLINE

In-House Course

Design & Analysis of Floating Wind Turbine Structures

(A Maritime Company for Courses, Conferences and Research)

PROGRAMME (ALL TIMINGS are in BST (GMT+1)

DAY 1

09:00- 10:30 Lecture 1: Marine and offshore environments in offshore wind farms

- Overview of marine and offshore environments (including return period)
- Method for describing wind
- Method for describing tidal current
- Calculation of the wind and tidal current resultant loads applied to floating wind turbines

Dr Wenxian Yang

10:30-11:00 *Break*

11:00: - 12.30 Lecture 2: Ocean Wave Analysis Applied to Floating Wind Turbines

- Method for describing ocean waves
- Wave statistics
- Wave models
- Motions of floating wind turbines in waves

Dr Wenxian Yang

12.30 - 13.30 Lunch

13.30 - 15.00 Lecture 3: Wave and Current Loadings for Floating Wind Turbines

- Introduction of linear wave theory
- Introduction of velocity potential functions
- Introduction of diffraction theory

Dr Wenxian Yang

15:00 - 15.30 *Break*

15.30 - 17.00 Lecture 4: Hydrodynamic Design Aspects of Floating Wind Turbine Platforms

- Requirements for hydrodynamic design of floating wind turbine platforms
- Optimal design for meeting the requirements
- Discussion of the existing designs

Dr Wenxian Yang

DAY 2

09:00- 10:30 Lecture 5: Catenary Mooring System Analysis for Floating Wind Turbines

- Introduction of catenary mooring systems
- Design of catenary mooring systems
- Safety assessment of catenary mooring systems

Dr Wenxian Yang

10:30-11:00 *Break*

11:00: - 12.30 Lecture 6: OpenFast : Basic introduction and wind modelling

- Introduction of OpenFAST (its functions and development)
- Download and run OpenFAST
- Modules in OpenFAST
- Essential inputs for a simulation
- Generation of turbulent wind field
- Configuration of InflowWind
- Examples for different wind conditions (steady,uniform, turbulent)

Dr Yang Yang

12.30 - 13.30 Lunch

13.30 - 15.00 Lecture 7: OpenFast: Fully coupled simulation of an onshore wind turbine

- Aerodynamic modelling (AeroDyn14/15)
- Structural modeling of blades and tower using BModes
- Controller definition
- Output definitions
- Examples

Dr Yang Yang

15:00 - 15.30 *Break*

15.30 - 17.00 *Lecture 8*: OpenFast: Fully coupled simulation of floating offshore wind turbines

- *Modelling of hydrodynamics of the floating platform*
- *Modelling of mooring lines in FEAMooring or MoorDyn*

- Free Decay Simulations

Dr Yang Yang

About the Lecturers

Dr Wenxian Yang, Senior Lecturer in Offshore Renewable Energy

Dr Wenxian Yang obtained his PhD degree from Xi'an Jiaotong University in 1999. He is currently a Senior Lecturer in offshore renewable energy at Newcastle University. Dr Yang is a chartered engineer, the Fellow of the UK Higher Education Academy, the member of the Royal Institution of Naval Architects, the Institution of Engineering and Technology, and the American Society of Mechanical Engineers. With expertise in marine and offshore renewable energy, he has consistently strived to lower the Cost of Energy of offshore renewable power by developing various approaches using the knowledge in multiple disciplines, e.g. increasing availability and reducing operation and maintenance cost of offshore wind turbines by developing advanced condition monitoring techniques; assuring the safety of the fixed foundation of offshore wind turbines by designing and developing countermeasure devices against scour caused by tidal current; improving the power generation efficiency of wind and tidal turbine by developing biomimetic airfoil/hydrofoil technologies; increasing the economic return of offshore floating wind turbines by developing motion-stable floating platform technologies. Recently, in order to meet the urgent requirement by the rapidly growing offshore wind market, Dr Yang's research interest is also extended to addressing the challenging issues existing in the design and application of offshore wind farm support vessels. For example, in view of the unsatisfactory seakeeping performance of offshore wind farm crew transfer vessel, he has developed a new costeffective technique dedicatedly for stabilizing wind farm crew transfer vessels; to enable quickly access to those offshore wind turbines located at far offshore distance whilst costing less fuel and achieving better seakeeping performance, he developed a number of innovative ship design techniques and successfully supervised 6 postgraduate research theses to address the issue. In 2017, his research on the ageing issues of wind turbine components and assemblies was identified by Renewable Energy Global Innovation as a key contribution to the excellence in renewable and clean energy research.

Besides these. Dr Yang endeavours to develop research in the cutting-edge area of renewable energy also through collaborating with the scientists and experts working in different fields. For example, he worked together with the material and chemical engineering scientists of the universities of Newcastle, Durham and Northumbria and successfully established the 'Northeast Centre for Energy Materials' funded by EPSRC in 2017. So far, Dr Yang has published over 100 papers in top journals. According to the latest survey of Google Scholar, his papers have been cited 1652 times since 2014. Dr Yang's successful research has also attracted great interest from industrial partners. For example, Dr Yang was funded by Innovate UK to lead a 3-year Knowledge Transfer project (2014-2017) in order to help Offshore Renewable Energy CATAPULT Centre (ORE-CATAPULT) to improve the safe operation of their offshore wind turbines.

Dr Yang Yang, Associate Professor at the Ningbo University, China

Dr Yang Yang obtained his PhD degree from University of Shanghai for Science & Technology (USST). His doctoral thesis is on' Seismic analysis of offshore wind turbines'. He is an outstanding student in his undergraduate class of USST where he did his bachelor's degree in Power Machinery and Engineering. He was a visiting scholar at the Liverpool John Moores University (LJMU), UK where he was responsible for various projects namely (i) Development of a fully coupled tool for a multi-body floating offshore wind turbines (FOWT),(ii) Development of FOWT controller considering the platform motion feedback;(iii) Identification of damage hotspots of the FOWT and (iv) Development of a damage diagnosis approach for the FOWT. He is now an associate professor at the Ningbo University, China.