



# RENEWABLE AND DISTRIBUTED GENERATION CONNECT: PROFESSIONAL DEVELOPMENT

**17<sup>th</sup> & 18<sup>th</sup> July 2014**  
**University of Wollongong**

## **GRID CONNECTED RENEWABLE AND DISTRIBUTED GENERATION**

A two day professional development course in power engineering presented by the Australian Power Quality and Reliability Centre and the Sustainable Buildings Research Centre at the University of Wollongong.



AUSTRALIAN POWER QUALITY  
AND RELIABILITY CENTRE

**sbrc**

SUSTAINABLE  
BUILDINGS  
RESEARCH  
CENTRE

UNIVERSITY OF  
WOLLONGONG



# GRID CONNECTED RENEWABLE AND DISTRIBUTED GENERATION

## CONNECT: PROFESSIONAL DEVELOPMENT

### COURSE OBJECTIVES

Renewable and distributed generation (DG) provides an effective means to improve network efficiency, decrease reliance on high carbon emission generation, and allow consumers to increase responsibility for their own electricity needs. However, the rapidly increasing installation of DG to include solar and wind has increased the complexity and uncertainty in operation, control and protection of the networks.

This course will give a practical understanding of the principles, practices and problems associated with grid connection of these resources. Further areas covered in the course include the operation, control and protection of generation-rich electricity distribution networks, network planning and reliability aspects for facilitating integration of these new generating units.

This course will cover mainly solar and wind power integration, and energy storage applications. Delegates will learn fundamental aspects, operation, control and protection techniques, and methods of integration to improve supply quality and reliability for utilities and customers. The course will also include practical case studies of renewable energy integration problems and solutions from local industry experts and researchers.

### COURSE BENEFITS

By attending the course, you will gain knowledge and skills to assist you to:

- appreciate different renewable and distributed generation resources, their operation, and functional aspects;
- have a systematic understanding of the impact of different renewable and distributed generation resources on electricity network operation, control and protection
- gain knowledge of guidelines and standards for integration of these new energy resources into electricity grids
- be aware of the design of interfaces for different types of renewable energy resources and their particular applications for network benefits
- gain a practical understanding of various power quality problems associated with renewable and distributed generation integration including exposure to specific case studies, and
- gain knowledge of how to accommodate these devices economically without violating network constraints.

### WHO SHOULD ATTEND

Managers, utility specialists and technical staff who wish to advise customers on renewable energy integration, or who provide services to large clients, or those who wish to understand aspects of network design, construction and maintenance techniques for maximising renewable energy penetration.

Graduates, end-users or personnel working in all areas of power system design want to understand how the system interacts with DG, will also benefit from attending this course.

## COURSE OUTLINE

The course is conducted over two days commencing at 8:30 am on Thursday 17<sup>th</sup> July, 2014 and comprises lectures and demonstrations. Present course outline is provided below.

### Day 1

Time	Topic
8:30 am	Registration
	<ul style="list-style-type: none"><li>• Introduction to renewable and distributed generation</li><li>• Photovoltaic systems and solar energy</li></ul>
	<i>Morning Tea</i>
	<ul style="list-style-type: none"><li>• Wind energy systems</li><li>• Power electronic applications in renewable and distributed generation</li></ul>
	<i>Lunch</i>
	<ul style="list-style-type: none"><li>• Network planning with distributed generation</li><li>• Discussion session</li></ul>
	<i>Afternoon Tea</i>
	<ul style="list-style-type: none"><li>• Voltage regulation with distributed generation and mitigation techniques</li></ul>
5:00 pm	Conclusion Day 1

### Day 2

Time	Topic
8:30 am	Start Day 2
	<ul style="list-style-type: none"><li>• Computer simulation exercises and demonstration</li><li>• Energy storage technologies and design application</li></ul>
	<i>Morning Tea</i>
	<ul style="list-style-type: none"><li>• Grid connection standards and codes</li><li>• Impact of renewable and distributed generation on network dynamics and stability</li></ul>
	<i>Lunch</i>
	<ul style="list-style-type: none"><li>• Distributed generation protection</li><li>• Network support using distributed generation</li></ul>
	<i>Afternoon Tea</i>
	<ul style="list-style-type: none"><li>• Discussion session and course summary</li></ul>
5:00 pm	Conclusion Day 2

## TRAINING INVESTMENT

The course investment provides for an inclusive industry related training package with course notes, lunches and morning and afternoon tea. Course fee per person is AUD\$1,210 including GST. Participants may count course hours towards their CPD requirements.

## ABOUT THE SPEAKERS

**Professor Danny Sutanto** is Professor of Power Engineering in the School of Electrical, Computer and Telecommunications Engineering. His research interests include power electronic applications in industry and electrical transmission and distribution networks.

**Dr Lasantha Meegahapola** is a Lecturer with the Australian Power Quality and Reliability Centre. His areas of research include renewable power generation, system stability, active distribution networks and reactive power control, and intelligent power systems.

**Mr Sean Elphick** is a Professional Officer with the Australian Power Quality and Reliability Centre. He is active in the areas of solar PV, power quality monitoring and data analysis.

**Professor Leith Elder** is Senior Engineer Network Research with Essential Energy with over 50 years experience in the electricity industry including tariffs, market and distributed generation installations dealing with problems of network design and operation.

**Mr Neil Browne** is Power Quality, Protection and Operational Analysis Manager with Endeavour Energy with experience of planning distribution networks containing distributed generation.

**Mr Rob Corke** is Secondary Systems Support Manager with Ausgrid and has extensive experience with protection systems for distributed generation.

**Dr Duane Robinson** is a Senior Lecturer with the Sustainable Buildings Research Centre. His area of research interests are energy efficiency, renewable energy and power quality.

**Other invited industry speakers** may also participate in this course to provide case studies and practical experience of renewable and distributed generation projects.

## THE VENUE

The course will be held at the Sustainable Buildings Research Centre, Building 237, University of Wollongong Innovation Campus, Squires Way, North Wollongong.

## ACCOMMODATION

Arrangements for accommodation are the responsibility of participants and costs are not included in the course fee. A list of hotels and motels in the Wollongong area will be supplied to participants upon registration. Daily travel from Sydney is convenient by road or train.

## ENQUIRIES

*Registration enquiries:*

Please call **Ms Raina Lewis** at the Australian Power Quality and Reliability Centre, University of Wollongong.

Phone: (02) 4221 3335

Email: [raina.lewis@uow.edu.au](mailto:raina.lewis@uow.edu.au)

*Course enquiries:*

Please call **Dr Duane Robinson** at the Sustainable Buildings Research Centre, University of Wollongong.

Phone: (02) 4221 4530

Email: [duane@uow.edu.au](mailto:duane@uow.edu.au)

# GRID CONNECTED RENEWABLE AND DISTRIBUTED GENERATION PROFESSIONAL DEVELOPMENT COURSE

REGISTRATION FORM: 17–18 July 2014, University of Wollongong

Please enrol me in the two-day course “Renewable and Distributed Generation”, to be held in Wollongong, Australia from 17<sup>th</sup> to 18<sup>th</sup> July 2013.

Cost per person: AUD\$ 1,210 inclusive of GST. Please register before 27<sup>th</sup> June 2014 (see note below).

Surname: ..... Given Name: .....  
Organisation: ..... Job title/position: .....  
Postal Address: .....  
State: ..... Postcode: ..... Country: .....  
Telephone: ..... Fax: .....  
Mobile: ..... Email: .....  
Special dietary requirements: .....

## PRE-COURSE QUESTIONNAIRE

To assist us to tailor the course to your experience, please answer the following (*circle the appropriate weighting*).

	Very Limited				Very Extensive
My knowledge in the field of renewable and distributed generation is:	1	2	3	4	5
My project experience in the field of renewable and distributed generation is:	1	2	3	4	5
My organisation's objectives in the field of renewable and distributed generation are:	1	2	3	4	5
My organisation's project experience in the field of renewable and distributed generation is:	1	2	3	4	5
My engineering or other professional discipline is: .....					

## METHODS OF PAYMENT

☐ If paying by **credit card**, please complete the details below, scan and email to [raina\\_lewis@uow.edu.au](mailto:raina_lewis@uow.edu.au)

Please debit (circle):      Bankcard      Visa      Mastercard

Card number:     -     -     -

Expires:   /   in the amount of

AUD\$: .....

Name on card: .....

Signature: .....

Email for receipt: .....

☐ **Cheque** payable to “The University of Wollongong”

**Mail to:** Attention: Ms Raina Lewis  
(CPD Course Registration)  
School of Elec., Comp., and Telecom Engineering  
University of Wollongong, NSW, 2522, Australia

**Payment Enquires:** Ms Raina Lewis  
APQRC Administration Officer  
Ph: (02) 4221 3335  
Email: [raina\\_lewis@uow.edu.au](mailto:raina_lewis@uow.edu.au)

**Note:** There is no guarantee that economic participation levels for this course can be achieved. Registrants will be notified on the 30<sup>th</sup> June 2014 if the course cannot proceed due to insufficient numbers. The program may be changed at any time due to unforeseen circumstances. If the course cannot proceed for any reason, UOW will not accept liability of whatsoever kind for expenses incurred by any person or corporation with the sole exception of the course investment, which will be refunded in full.