

2021 Continuing Professional Development Courses



THE AUSTRALIAN POWER QUALITY & RELIABILITY CENTRE IS OFFERING THE FOLLOWING CONTINUING PROFESSIONAL DEVELOPMENT COURSES IN 2021:

- **INTRODUCTION TO QUALITY OF ELECTRICAL SUPPLY**
 - 9-10 JUNE 2021
- **INTRODUCTION TO PSCAD**
 - 16-17 JUNE 2021
- **ADVANCED PSCAD TECHNICAL WORKSHOP**
 - 7-8 JULY 2021
- **RENEWABLE & DISTRIBUTED GENERATION**
 - 28-29 JULY 2021
- **BATTERY ENERGY STORAGE**
 - 4-5 AUGUST 2021
- **ADVANCED QUALITY OF ELECTRICAL SUPPLY**
 - 18-19 AUGUST 2021
- **GENERATOR CONNECTION**
 - 8-9 SEPTEMBER 2021
- **POWER QUALITY WITH A FOCUS ON RENEWABLE ENERGY**
 - 22-23 SEPTEMBER 2021
- **SOLAR PV ENERGY SYSTEMS**
 - 20-21 OCTOBER 2021
- **APPLICATION OF AUSTRALIAN STANDARDS FOR MANAGEMENT OF HARMONICS, UNBALANCE AND FLICKER**
 - 3-4 NOVEMBER 2021



**UNIVERSITY
OF WOLLONGONG
AUSTRALIA**

CUSTOMISED IN-HOUSE COURSES AVAILABLE

We can come to you to provide customised courses on a range of topics at your location.

ENQUIRIES

For more information, contact Ms Joanne Robson, University of Wollongong.

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TRAINING INVESTMENT

The course investment provides for an inclusive industry related training package with course notes, lunches and morning and afternoon tea. Participants may count course hours towards their CPD requirements

INTRODUCTION TO QUALITY OF ELECTRICAL SUPPLY 9-10 JUNE 2021

This introductory course is suitable for all individuals working in the electrical power engineering industry. This includes managers, utility specialists and technical staff who wish to advise customers on power quality concerns, or who service large customers or who wish to understand aspects of network design, construction and maintenance techniques for maximising quality of supply. At the conclusion of the course, you will have gained the following:

- A systematic understanding of the various power quality disturbances and the types of load affected
- Knowledge of the standards for particular types of disturbances and actions if limits are exceeded
- The ability to distinguish the different types of available power quality monitoring equipment and their particular applications
- Knowledge of how network operators and customers can improve their power quality performance

INTRODUCTION TO PSCAD 16-17 JUNE 2021

This course provides an introduction to the use of PSCAD and EMT modelling for the purposes of undertaking power system transient studies. It has been designed to give participants with little or no experience with PSCAD, the knowledge required to build EMT models of power systems and related components, execute simulations and retrieve results for analysis. After successful completion of the course participants will:

- Have an understanding of EMT modelling, its benefits and uses within the context of the Australian power system
- Be able to navigate the PSCAD user interface and understand project structuring
- Understand how to build EMT models in PSCAD and execute simulations
- Have the ability to generate outputs from the PSCAD workspace for analysis
- Understand the key components of network modelling for the purpose of undertaking power system studies in the time-domain

ADVANCED PSCAD TECHNICAL WORKSHOP 7-8 JULY 2021

This course focusses on the EMT study requirements for grid-scale renewable energy generator connections using PSCAD. Participants will develop an understanding of the requirements of connection studies and the pertinent modelling information required to undertake such studies. The course builds existing knowledge of PSCAD and presents advanced modelling techniques and processes. At successful completion, participants will:

- Have an understanding of the EMT modelling requirements for renewable energy generator connection studies
- Understand the possible interactions of inverter based resources with system components and possible impact on system stability
- Be able to develop advanced PSCAD modelling and analysis techniques in relation to machine models and inverter based resource connections
- Have the skills necessary to undertake representative case studies of generator connections and perform analysis on the interactions witnessed

Attendees should have a working understanding of how to complete simple modelling processes in PSCAD before attending this course. The *Introductory PSCAD course* is available and will provide participants with the experience required to complete this course.

RENEWABLE & DISTRIBUTED GENERATION 28-29 JULY 2021

This course has been designed to assist managers, utility specialists and technical staff who wish to advise customers on renewable energy integration or who provide services to large clients. The course will also be useful for those who wish to understand aspects of network design, construction and maintenance techniques for maximising renewable energy penetration. 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
- Gain an understanding of the impact of different renewable and distributed generation resources on electricity networks
- Gain knowledge of guidelines and standards for integration of these new energy resources into electricity grids
- Become aware of the design of interfaces for different types of renewable energy resources
- Gain a practical understanding of various power quality problems associated with renewable and distributed generation
- Gain knowledge of how to accommodate these devices economically without violating network constraints

BATTERY ENERGY STORAGE 4-5 AUGUST 2021

This course has been designed to assist any individual who is interested or requires better understanding of the operation and capabilities of battery energy storage systems, their advantages and disadvantages and how they can best be integrated into the electricity networks of the future. By attending the course, you will gain knowledge and skills to assist you to:

- Appreciate different battery energy storage technologies and their relative advantages and disadvantages
- Have a systematic understanding of the capabilities of battery energy storage systems and how they should be designed
- Understand battery management systems and their importance
- Gain knowledge of guidelines and standards for integration of energy storage systems into electricity grids
- Gain a practical understanding of various power quality problems associated with energy storage systems

ADVANCED QUALITY OF ELECTRICAL SUPPLY 18-19 AUGUST 2021

This advanced power quality course is designed for utility specialists, consultants, engineers and senior technical staff who wish to advise customers on power quality concerns, or who service large customers or who wish to understand aspects of network design, construction and maintenance techniques for maximising quality of supply. Following the course, participants will be able to:

- Calculate harmonic distortion levels, apply standards for harmonics and assess the effectiveness of mitigation methods.
- Calculate unbalance factors, understand the effects of unbalance on loads and appreciate unbalance standards
- Determine sag characteristics at a site and assess for sag mitigation strategies
- Understand how power electronic devices can be used to mitigate harmonics, unbalance and sags
- Better understand power quality monitoring methodologies

GENERATOR CONNECTION 8-9 SEPTEMBER 2021

Transformations in the Australian electricity network prompted the Australian Energy Market Operator (AEMO) to revise pre-connection study requirements for new generators increasing the complexity of the process. The continued uptake of large asynchronous generation introduces a number of challenges related to the control and stability of the power system. Implementation of the NER and AEMO's system strength impact assessment and modelling guidelines has introduced significant challenges for networks, proponents and consultants related to the acquisition, analysis and use of generator and network modelling data and performing the required pre-connection studies. This course will provide a detailed overview of the modelling and simulation requirements for large asynchronous generators connecting to weak networks, prompting the most onerous of connection processes.

The course will cover a number of topics related to the application of the NER and impact assessments including modelling techniques required for connecting generators and the network. Preliminary and Full Impact Assessments will be investigated with real-world indicative examples and simulation outcomes. Delegates will also learn the importance of detailed modelling techniques, the data that is required and how it is implemented in relation to connecting generators meeting their technical performance requirements

POWER QUALITY WITH A FOCUS ON RENEWABLE ENERGY 22-23 SEPTEMBER 2021

This course combines key components of the quality supply course with key components of the renewable energy and distributed generation course. The course is designed for 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 distributed generation, will also benefit from attending this course. By attending the course, you will gain knowledge and skills to assist you to:

- Gain a systematic understanding of the various power quality disturbances, including their causes and the types of loads affected
- Distinguish the different types of available power quality monitoring equipment and their particular applications
- Determine how utilities and customers can improve their power quality
- Appreciate different renewable and distributed generation resources, their operation, and functional aspects
- Gain knowledge of guidelines and standards for integration of renewable 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
- Have a systematic understanding of the capabilities of battery energy storage systems and how they should be designed
- Understand battery management systems and their importance
- Gain knowledge of guidelines and standards for integration of energy storage systems into electricity networks

SOLAR PV ENERGY SYSTEMS 20-21 OCTOBER 2021

The course will cover all areas of solar PV energy generation and network integration including:

- Solar PV cell technology
- Solar inverter technology
- Standards
- Solar PV network integration

The course is designed for engineers, technical officers and other staff working in areas where solar PV generation systems are of interest. No prior knowledge is required.

APPLICATION OF AUSTRALIAN POWER QUALITY STANDARDS 3-4 NOVEMBER 2021

This course been designed to assist individuals dealing with allocation of power quality emissions and would be of particular interest to engineers or technical officers working for network service providers or proponents connecting large loads or generators, particularly renewable energy generators such as solar and wind farms. The course is best suited to individuals working in the power quality field with some level of background knowledge. At the conclusion of the course participants will:

- Have an understanding of the causes and effects of harmonic distortion, voltage fluctuations and flicker and unbalance and the need to limit their magnitudes in electricity supply networks
- Have an understanding of the current Australian Standards related to power quality and how they work together to maintain acceptable quality of supply
- Understand the challenges in applying the Australian Standards for allocation of harmonic distortions, voltage fluctuation and flicker and unbalance
- Have worked through a number of practical applications calculations and case studies allowing them to confidently apply the concepts and methodologies defined in AS/NZS TR IEC 61000.3.6, AS/NZS TR IEC 61000.3.7 and AS/NZS TR IEC 61000.3.13

ENQUIRIES

Please call **Joanne Robson**

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