IEEE Northern Australia Section, Power & Energy Chapter & James Cook University invite you to attend the

IEEE Power System Engineering Workshop

9am-5pm, Mon. 25th- Wed. 27th August, 2025

Room 506-021, James Cook University, Townsville

by

A/Prof. Graham Woods

Overview

A solid understanding of Power Engineering fundamentals is essential for Electrical Engineering managers, educators, utility operators, asset maintenance personnel, equipment suppliers and system designers. Having the ability to apply Power Engineering principles to real world problems in industry can save time, expense, and lead to more reliable and sustainable outcomes. As the complexity of electrical distribution systems increase and new challenges arise with the expansion of distributed renewable energy generation, understanding the issues and ways to overcome them, becomes increasingly important.

The IEEE Power Systems Engineering Workshop aims to provide attendees with practical knowledge to understand the principles of Electrical power generation and distribution in an industrial environment. The workshop focuses on developing a practical understanding of how electrical power distribution systems work, common issues that can arise and practical methods to overcome such problems. The approach taken in the workshop is to develop practical appreciation of the concepts involved rather than a deeply theoretical understanding. The presenter draws on his practical knowledge and use of real-world examples to emphasize the key concepts involved. The relevant Australian and IEEE standards are explained and their application demonstrated.

The concepts taught are further enhanced through a series of guided, electrical engineering modelling case studies where the attendees will gain hands-on experience with the concepts developed in the training sessions. The attendees will use an industry standard software, SKM Power Tools for Windows (PTW), to model the case study examples, perform analysis and trial different mitigation strategies to overcome common electrical issues.

For further information please contact: Graham Woods <Graham.S.Woods@ieee.org>

The topics covered in the three-day workshop are;

Day 1 : Load Flow Analysis

- Power Systems Fundamentals : Real & Reactive Power Flows, Power Factor, Power Triangle
- Power Systems Modelling
- Introduction to PTW Software
- Load Flow Case Study : Voltage drop, cable sizing, transformer tap changes, capacitive compensation, local generation

Day 2 : Fault Analysis & Protection Coordination

- Fault Analysis Fundamentals : Symmetrical components, System modelling (3-phase, SLG, LLG), Standards (AS3851 versus IEC 60909)
- Fault Analysis Case Study : Motor contribution, breaker ratings, fuse limitation
- Protection Fundamentals : Device Characteristics, Transients, Coordination

Day 3 : Protection Coordination (Cont) & Harmonics

- Protection Case Study : Coordination Calculations, TCCs, Motor Starting, Transformer in-rush, OC & EF protection
- Harmonics Fundamentals & Standards : Harmonic Loads, Limits, Modelling, Standards IEEE 519 & IEC 61000.3.6-2022
- Harmonics Case Study : Harmonic Levels (THD, K-factor), Effect of Source Fault Level, Harmonic Filters & Transformer Phase Shift

The Workshop includes a copy of the PowerPoint presentations and Case Study Workbook. Lunch, morning & afternoon tea are provided. A basic understanding of how to use the PTW modelling software prior to attending the workshop is recommended.

The cost of the full, 3-day Workshop is $1500 (IEEE members) or $1800 (non-IEEE members). The Workshop is limited to a maximum of 20 attendees per day. Subject to availability, attendees may be able to attend only one or two days of the Workshop. Contact organizer to check availability for non-member or single day entry options. Monies raised by this workshop go to support the work of the IEEE Northern Australian Section.

Registration and secure on-line payment for the workshop can be done via the Eventbrite link https://www.eventbrite.com.au/e/ieee-power-systems-engineering-workshop-tickets-1511132480929?aff=2025IEEEPSE

To obtain further information, please contact the workshop organizer at the email address below.

Curriculum Vitae

Graham Woods is a Senior Member of the IEEE, Principal Consulting Engineer at Orana Engineering and an Adjunct Associate Professor at James Cook University. He received a Bachelor of Electrical Engineering degree (BE) in 1984, Master of Engineering Science (MEngSc) in Electrical Engineering in 1986 and Doctor of Philosophy (PhD) in Electrical Engineering in 1991; all from James Cook University. He is also a Registered Professional Engineer of Queensland (RPEQ) and Chartered Professional Engineer (CPEng). Graham was a Senior Lecturer and Head of the Electrical Engineering Discipline at James Cook University for almost 20 years; teaching courses in Power Engineering, Electronics, Signal Processing and Communications. He joined Orana Engineering as a Consulting engineer in 2009. In his professional capacity as a Consulting engineer, he has performed engineering design, analysis and testing work for numerous mining, minerals processing and commercial clients in heavy industry. Graham has a passion for electrical engineering concepts and their practical application in industry and is always keen to assist others with similar interests and a willingness to learn.