POWER SYSTEM WORKSHOP

Workshop Objectives

At the end of the workshop, the participant will have a good understanding of power system fundamentals and the relevance of power system studies in power system operation and design.

The knowledge gained will enable better communication between power system operators, designers, consultants and suppliers, thus increasing the overall efficiency of power system operation and design.

The workshop will provide graduate power system engineers with practical insight into power system operation and design.

For experienced power engineers and designers, the workshop will serve as a refresher course and also provide in-depth exposure to power system harmonics, protection system coordination and computer based power system studies.

Topics Covered

- Power System Harmonics
- Protection System Overview & Coordination
- Loadflow Studies
- Fault Studies
- Power System Fundamentals

Four Day Training Course — Presented by Bapu Seshaprasad (Sesha)

Sydney - 8th to 11th November 2011

Venue: Rydges Paramatta, 116 James Ruse Drive, Rosehill, NSW - 2142 (Ph: 02-8863 7600)

Why you should attend this workshop

If you are involved in modern industrial power system operation and if you answer "No" to any of the following questions, then you must attend this workshop!

- Do you know the cost of losses in your system?
- Do you know how much you can save by changing a transformer tap or by installing a capacitor?
- Do you know the voltage dip caused by a motor start-up in your system?
- Do you have a good understanding of harmonic problem - it's causes & effects and standards?
- Do you know whether your system meets the harmonic limits? (This is now a legal obligation)
- Do you know whether the devices in your system are adequately rated for fault conditions? (The changes in electric supply system can change the fault levels)

- Do you have an appreciation of the protection device characteristics?
- Are you sure that all the protection devices in your system are adequately coordinated?
- Do you have a good understanding of Power System fundamentals?

Who should attend this workshop

The workshop is designed for persons with practical involvement in power system design and operation. **Hence it is relevant for power system engineers, consultants, operators and senior technicians.**

All topics are presented starting from the basic level and in a logical sequence. The emphasis is on the concepts and practical aspects of power system studies.

No prior knowledge of power system modeling or theory is assumed. Basic computer keyboard skills will be useful.

About the workshop

The Power system workshop is designed to provide an in-depth understanding of power system fundamentals, loadflow studies, harmonic studies, fault studies and power system protection. The understanding is reinforced by hands-on practical case studies.

The case studies are done using Power*Tools for Windows (PTW) developed by SKM System Analysis Inc, USA. The workshop provides adequate introduction to PTW software features to conduct the case studies. No prior PTW experience is necessary. However, the workshop is not intended to provide training in advanced features of PTW software.

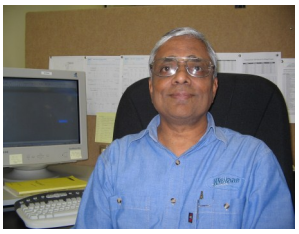
The workshop is based on 2 participants per computer. The class size is limited to 16.

For More Information Call

Carrie Hazeldine on Phone: (07) 4976 0600

POWER SYSTEM WORKSHOP

Meet the Instructor



Sesha has over 17 years of experience in teaching power systems at Central Queensland University and over 12 years of industry experience at Tata Electric Companies, Mumbai and Queensland Electricity Generating Board, Brisbane. Sesha is currently working at Welcon Technologies as Specialist Power Systems Engineer.

His industry experience includes design & development of power system software, conducting power system studies and setting up power system analysis groups for electric utilities in Iran and Liberia.

Sesha has received excellent feedback for his teaching style and the ability to explain complex topics in a simple and easy to understand manner.

Course Structure / Contents

Loadflow Studies & Harmonic Analysis

Day 1

POWER SYSTEM FUNDAMENTALS
* Power system device models
* Power system network modeling
* Three phase system analysis
* Symmetrical components
* Per unit system

PTW SOFTWARE TUTORIAL
* Overview of software features
* Building a loadflow system model
* Data entry / edit features

LOADFLOW ANALYSIS
* Relevance of loadflow
* Loadflow modeling
* Concept of swing bus

LOADFLOW CASE STUDIES
* Case Study 1 (Tutorial)
* Case Study 2

Day 2

POWER SYSTEM HARMONICS
* Sources of harmonics
* Harmonic terminologies
* Effects of Harmonics
* Harmonic system analysis

HARMONIC STANDARDS
* Overview of Harmonic standards
* IEEE 519 - 1992
* AS 61000-3.6 - 2001

HARMONIC CASE STUDIES
* Case Study 3 (Tutorial)
* Case Study 4

Fault Analysis and Protection Coordination

Day 3

FAULTED SYSTEM ANALYSIS
* Faulted system modeling
* Three phase and Single phase to Ground faults
* Fault Transients
* Breaker ratings
* Overview of AS3851 and IEC 60909
* Transformer modeling
* Transformer phase shift and vector group

PTW SOFTWARE TUTORIAL
* Overview of software features
* Building a faulted system model
* Fault study tutorial

FAULT ANALYSIS CASE STUDIES
* Case Study 5
* Case Study 6

Day 4

PROTECTION SYSTEM OVERVIEW
* Protection fundamentals
* CT specifications
* Protection device characteristics
* Fuses
* MCBs / MCCBs / ACBs
* Overcurrent Relays
* Earth fault protection

PROTECTION SYSTEM COORDINATION
* Case Study 7 (Tutorial)
* Calculation of plug / time settings
* Relay coordination using PTW
* Relay groups / Time-current characteristics
* Case Study 8

POWER SYSTEM WORKSHOP

Delegate Details

Name: _____

Job Title: _____

Company Name: _____

Company Address: _____

State: _____ P/Code: _____

Phone: (___) _____ Fax: (___) _____

E-mail: _____

Workshop Schedule

- Workshop starts at 8:30am and finish at 4:30pm daily.
- Registration is from 8:30am to 8:45am on the first day.

Registration Details

Yes, I would like to attend the following workshop (Please tick the relevant boxes).

☐ **Sydney, NSW**
8th to 11th November 2011

Venue:
Strawberry Road
Rydges Parramatta
116, James Ruse Drive
Rosehill
NSW 2142
(Ph: 02 - 8863 7600)

☐ **Early Bird Registration**
$2350.00 per person (Excluding GST)
(Registration & Payment required four weeks prior to the start of the Workshop)

☐ **Regular Registration**
$2600.00 per person (Excluding GST)
(Registration & Payment required two weeks prior to the start of the Workshop)

- The workshop fees are per delegate and include handouts, lunches and all refreshments.
- Workshop offerings are subject to minimum required numbers of participants.

Payment Details

Please find enclosed a:

☐ **Cheque**, made payable to **Welcon Technologies Pty Ltd**

☐ **Company order number:** _____

Please pay by Direct Credit:

Name of Bank: ANZ Bank Gladstone

BSB Number: 014 580

Account Number: 3507 72908

Account Name: Welcon Technologies Pty Ltd

Cancellation Policy

- **All cancellations one week prior to start date will incur a 15% cancellation fee.**
- **No Cancellation or refund is allowed within one week of the start date. However, substitutes are welcome.**

4 Ways to Register

1. By Phone: Gladstone (07) 4976 0600

2. By Fax: Gladstone (07) 4972 4820

3. By Mail: Level 3, 100 Goondoon Street
GLADSTONE QLD 4680
Or
PO Box 307
GLADSTONE QLD 4680

4. Email: carrie.hazeldine@welcon.com.au

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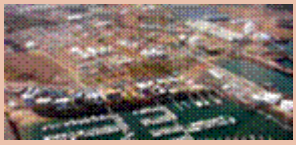
COMMENTS FROM PARTICIPANTS

- This has clearly been the best value, most informative and best presented course I have been to in my career thus far.
- Good explanation of relevant power system concepts and practical insight into every day industry problems.
- Sesha is very knowledgeable, easy to speak with and ask questions.
- Was a good expansion of my knowledge already gained from University, but was directed more towards practical application.
- Was well planned and very helpful with all questions, and Sesha knew his work very well.
- Sesha tries very hard to combine theoretical ideas with practical explanations. I believe he generally succeeds.
- Found PTW software case studies very interesting.
- Workshop has given me a better understanding and insight into my role as an electrical engineer.
- The course had a very practical basis, not just with tutorials but also with lecture material presented . The relevant standards were well referenced and the lecturer's experience was exemplary.



The Power System Workshops consisted of Electrical Engineers, Senior Engineers, Graduate Engineers and Senior Electricians.

Introducing……**Welcon Technologies**

Welcon Technologies has been in business since April 1998, and has experienced steady and consistent **growth** in business revenue, client-base and staff numbers. Starting with only five employees, the business has grown to **34 employees**, in three locations, Gladstone, Townsville & Sydney with all sites still needing more staff to meet our client's needs.

The business is based in one of the premier office complexes in Gladstone, with an open plan layout that encourages **communication** between staff members, but allows privacy when required. The working environment is friendly and personal, with many staff developing close **relationships** after hours on a social basis.

Already one of the largest Electrical Engineering & Information Systems companies in Queensland, Welcon Technologies is a **growing** business, with a clear plan for the future. However, the companies remain flexible to follow new **opportunities** as they arrive.

For staff, there are opportunities for advancing their **careers** in both technical and team management directions, and advancement is based on demonstrated skills, enthusiasm and relevant experience. Alliances with complementary organisations also provide opportunities to work on larger multi-discipline projects. The combination of projects that cover both electrical engineering and information systems also provides possibilities for staff to work in both these exciting and fast moving areas.

For more information see http://www.welcon.com.au

Engineered Solutions For:

- Power Systems
- Control Systems
- Process Instrumentation
- Information Technology