Practical Process Control Workshop

A two-day practical workshop covering all the essentials of process control including the tools to optimise the operation of your plant and the ability to perform effective loop tuning.

PERTH – 1st & 2nd March 2018

East Perth Campus of North Metropolitan TAFE

Workshop Presenter:
STEVE MACKAY
PhD, Process Control Consultant
Technical Director, IDC Technologies

WHAT YOU WILL GAIN FROM ATTENDING THIS TRAINING:

- Understand the fundamentals of process control and new techniques
- Learn how to tune PID control loops
- Correct stability problems
- Understand cascade loops and feed-forward control
- Identify and correct problems with dead time in the process
- Enhance your learning with carefully constructed workshop exercises
- Learn from industry case studies

WHO SHOULD ATTEND:

- Automation engineers
- Building service designers
- Consulting engineers
- Control engineers
- Control technicians
- DCS personnel
- Electrical engineers and technicians
- Electricians
- Energy management consultants
- Instrumentation engineers
- Instrumentation technicians
- Maintenance engineers
- Process engineers
- Process operators

And those involved in the design, implementation and upgrading of industrial control systems.

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DISCOUNTS

EARLY BIRD OFFER!
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AND/OR

3 FOR 2 OFFER!
SAVE $1495
See registration page for details

FOR MORE INFORMATION

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Overview:

8.00am – Registrations Open
8.30am – Workshop Commences

This practical workshop covers all the essentials of process control and tools to optimise the operation of your plant and process, including the ability to perform effective loop tuning.

Practical process control is aimed at engineers and technicians who wish to have a clear, practical understanding of the essentials of process control and loop tuning, as well as how to optimise the operation of their particular plant or process. These persons would typically be primarily involved in the design, implementation and upgrading of industrial control systems.

This is a practical, hands-on workshop enabling you to work through exercises which reinforce the concepts discussed. Practical sessions include:

- Model response
- Trial and error tuning
- Ziegler Nichols tuning
- Open loop step analysis
- Feed Forward
- IMC tuning

To gain full value from this workshop, please bring your laptop/notebook computer.
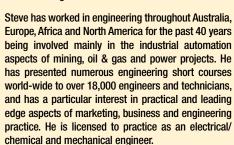
Pre-requisites:
Basic electrical concepts would be useful.

WORKSHOP PRESENTER:

STEVE MACKAY

PhD, Process Control Consultant

Technical Director, IDC Technologies

Steve has worked in engineering throughout Australia, Europe, Africa and North America for the past 40 years being involved mainly in the industrial automation aspects of mining, oil & gas and power projects. He has presented numerous engineering short courses world-wide to over 18,000 engineers and technicians, and has a particular interest in practical and leading edge aspects of marketing, business and engineering practice. He is licensed to practice as an electrical/chemical and mechanical engineer.

Steve has also acted as the author or editor of over 30 engineering textbooks sold throughout the world. Steve is passionate about instrumentation and process control and has designed, programmed and installed more PLCs, DCS, and SCADA systems than he cares to remember. These have ranged from iron ore plants, off shore platforms and power stations to chemical plants. Steve is an entertaining and enthusiastic instructor. By attending this workshop you will walk away with many new skills and know how for your toolbox.

Program:

DAY 1 – TOPICS INCLUDE:

INTRODUCTION TO BASIC CONTROL CONCEPTS
- Typical manual control
- Feedback and feed-forward control
- Block diagrams

INTRODUCTION TO SENSORS AND TRANSMITTERS
- Selection and specification of devices
- Pressure transmitters
- Flow meters
- Level transmitters
- Temperature sensors

INTRODUCTION TO CONTROL VALVES
- Basic principles
- Rotary control valves
- Ball valves
- Control valve characteristics and specifications

BASIC PRINCIPLES OF CONTROL SYSTEMS
- On/off control
- Modulation control
- Principle of closed loop control
- PID control modes

STABILITY AND CONTROL MODES OF CLOSED LOOPS
- Cause of instability in control loops
- Change of stability through PID control modes
- Methods to improve stability
- Principles of closed loop control tuning

DIGITAL CONTROL PRINCIPLES
- Principle of incremental control algorithms
- Identifying control blocks in the time and frequency domain
- Multiple outputs through digital algorithms

IDEAL PID VS REAL PID
- Non-field-interactive or ideal PID
- Field-interactive or real PID
- Distinguish between process noise and instability
- Selection of ideal or real PID

TUNING OF CLOSED LOOP CONTROL
- Tuning constants calculation according to Ziegler and Nichols
- Open loop tuning procedure
- Closed loop tuning procedure
- Damped oscillation tuning method
- Fine tuning of practical control loops
- Tuning considerations for controllers with saturation and non-saturation output limits

4.30pm – Workshop Closes

DAY 2 – TOPICS INCLUDE:

CASCADE CONTROL
- Equation types for cascade control
- Initialisation and PV – tracking
- Use of multiple outputs in cascade control
- Tuning procedure for cascade control

FEED-FORWARD CONTROL
- Feed-forward balance – a control concept
- Tuning procedure for feed-forward control

COMBINED FEEDBACK AND FEED-FORWARD CONTROL
- Concept of combined control with incremental algorithms
- Tuning procedure for combined control

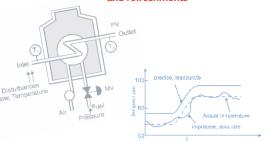**LONG DEAD-TIME IN CLOSED LOOP CONTROL**
- The problem of long dead-time in closed loops
- Use of process simulation for process variable prediction
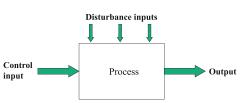- Tuning procedure for control loops with long dead-time

EXPERT SYSTEM AND MODEL BASED SELF TUNING CONTROLLERS
- Basis auto tuning
- Expert system control
- Model based adaptive control

Summary, Discussion Session and Closing

The fee for each workshop covers all materials including workshop manual, lunches and refreshments

Disturbance inputs

Control input → Process → Output

Control inputs are also known as "manipulated variables"
The output is the process variable to be controlled

FREE REFERENCE MANUAL
as a hard-copy and eBook

Our delegates don't just receive photocopied notes!

You will receive the comprehensive fully illustrated reference manual, as a hard-copy and eBook version, filled with hundreds of pages of tables, charts, figures and handy hints.

REGISTRATION FORM:
PRACTICAL PROCESS CONTROL WORKSHOP
Perth – 1st & 2nd March 2018
East Perth Campus of North Metropolitan TAFE
Simply complete this registration form online or return by email

EARLY BIRD OFFER:
10% off the forum fee
for registrations received on
or before 1st February 2018
– SAVE $150

AND /OR

3 FOR 2 OFFER:
Register 3 delegates
and only pay for 2
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1. DELEGATE DETAILS

Contact: _____ Company Name: _____

Company Address: _____

Suburb: _____ State: _____ Post Code: _____ Phone: _____

Admin/Accounts Payable Email: _____

ATTENDEES:

1 Mr/Ms: _____ Job Title: _____
Email: _____

2 Mr/Ms: _____ Job Title: _____
Email: _____

3 Mr/Ms: _____ Job Title: _____
Email: _____

2. HOW DID YOU HEAR ABOUT THIS EVENT?

☐ Received an email from IDC   ☐ Received a brochure in the mail   ☐ Searched online (Google, Yahoo etc)

☐ Recommended by a friend/colleague   ☐ Magazine advertisement/insert (please specify which magazine below)

☐ Other (please specify) _____

3. REGISTRATION & PAYMENT DETAILS   Prices shown are inclusive of GST

PRACTICAL PROCESS CONTROL WORKSHOP

PERTH – 1st & 2nd March 2018
East Perth Campus of North Metropolitan TAFE

☐ **OPTION 1: Early Bird Discount 10% OFF**
– Book **on or before** 1st February 2018 (**SAVE $149.50**) $1345.50 x _____ delegates = $ _____

☐ **OPTION 2: Standard Rate (NO Early Bird Discount)**
– Book **after** 1st February 2018 $1495 x _____ delegates = $ _____

☐ **OPTION 3: 3 for 2 Offer AND Early Bird Discount**
– Book **on or before** 1st February 2018 (**SAVE $1794**)   3 delegates: 2 x $1345.50 = **$2691** = $ _____

☐ **OPTION 4: 3 for 2 Offer Standard Rate (NO Early Bird)**
– Book **after** 1st February 2018 (**SAVE $1495**)   3 delegates: 2 x $1495 = **$2990** = $ _____

Corporate Packages available upon request

TOTAL DUE = $ _____

PLEASE NOTE: Full payment is required prior to the commencement of the workshop.

I wish to pay by: ☐ EFT   ☐ Direct Deposit   ☐ Company Purchase Order Number: _____

Please charge my: ☐ **Mastercard**   ☐ **VISA**   ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

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