ADVANCED CABLES
20 – 22 MAY 2015, SINGAPORE

Topics Covered

Cable Principles & Rating

Cable Circuit Design
Cable Circuit Installation

Cable Asset Management

Expert Course Faculty
Vukan Polimac

HRDF CLAIMABLE
*Subject to terms and conditions
Course Overview

A three-day course on cable system engineering, using example circuits, to take the participants from the planning stage through to the preparation of technical and commercial specifications for the tender document, bid adjudication, contract award, manufacture, installation, maintenance and operation. The management of existing cable assets is considered in terms of condition assessment, life estimation, repair and diversions.

Course Objectives

The 3 day course covers the following topics:
- Understand cable principles and physics
- Gain knowledge of existing cable types
- Learn the criteria and practical techniques for specify a new cable system
- Understand a cable manufacturing process
- Have a comprehensive understanding of cables installation
- Gain knowledge of cable bonding systems
- Gain knowledge of cable accessories
- Understand the safety considerations when working on HV cables
- Understand the environmental aspects related to HV cables
- Gain knowledge of a temperature monitoring of HV cables
- Learn how to maintain HV cables
- Learn operational aspects of HV cable systems

Who Should Attend

This course is intended for:
- Design Engineers/Technicians
- Industrial and Utility Engineers/Technicians
- Managers of design engineering departments
- Construction Supervisors
- Electrical Engineers/Technicians
- Consulting Engineers/Technicians
- Planners of Power Systems
- Project Engineers
- Safety Professionals
- Others who want a knowledge of a substation design

Other Unique Features with powerEDGE Training

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan
# 3 Day Course Outline

## DAY 1
### Cable Principles & Rating
- **Cable Principles**
  - Definition & Purpose
  - Cable Cross Section
  - Cable System

- **Cable Physics**
  - Cable Equivalent Diagram
  - Cable Impedance & Capacitance
  - Cable Electric Field
  - Cable Thermal Considerations
  - Skin Effect in Cables
  - Proximity Effect in Cables

- **Existing Cable Types**
  - Oil filled cables
  - Gas Cables
  - XLPE cables

- **Selecting New Cable Systems**
  - Selecting Cable Type

- **Cable Rating Practice**
  - Method to Determine Cable Ratings
  - Impact of System Constrains
  - Effects of Design & Installation
  - Environmental Effects on Rating
  - Example for Cable Rating Calculation

## DAY 2
### Cable Circuit Design
- **Cable Circuit Design**

- **Planning Summary**

- **Installation and Environmental Planning**
  - Cable Route Planning
  - Selecting Installation Method
  - Selecting Support Structures
  - Some Installation Considerations
  - Environmental Considerations

- **Cable Section Lengths**

## DAY 3
### Cable Circuit Installation
- **Safety & Installation Practice**
  - Safe Working Procedures
  - Impressed Voltages

- **Cable Circuit Installation**
  - Cables Installation Types
  - Cable Installation Process
  - Installation Considerations

- **Cables Circuit Testing**
  - Short Circuit Testing – Cables & Accessories
  - HV Cables Testing

### Cable Asset Management
- **Cable System Operation**
- **Temperature & On-Line Monitoring**
- **Cable System Maintenance**
Your Expert Faculty: Vukan Polimac

In his 30 years working experience he provided highest quality services in system planning and analysis to major transmission and distribution and transportation companies including London Underground, National Grid Company (UK), MTRC Metro in Hong Kong, West Coast Main Line connection to NG, Scottish Power, ESB-Ireland, ESKOM-South Africa, Mauritius CEB, Balkan countries - grids of Romania and former Yugoslavia, HV network ISA-Colombia, Western Power Distribution-UK, etc.

Vukan's technical expertise includes most aspects of power systems analysis, electrical asset management and railway connections to power networks where he provides solutions to technical problems and supports other field’s experts in complex assignments. He has project management skills in technical and environmental projects as well as experience in short and long-strategic term planning, maintenance and asset management, power quality analysis of transmission and generation systems, distribution, transportation and other power networks. Experienced in generation and network integration, electrical component of energy master plans as well as strategic asset replacement, he was also involved in load- forecast analysis and generation dispatching. Published papers on asset management based on projects and experience in working for distribution companies in Africa and Europe.

Vukan is very experienced in design, procurement, commissioning, erection and refurbishment of major projects in transmission and distribution substations up to 420 kV and hydro and thermal power plants. Served as project manager on several major projects as well as head of the Engineering Group, Vukan was responsible for final design, equipment specifications, layouts tender evaluation and commissioning. He has carried out conceptual development of protection and control philosophy for various projects as well as reviewed and approved project drawings and documents. He has applied the latest IEC standards, various codes of practice and engineering recommendations. He has also specific experience in conceptual design of power supply for transportation and traction railway systems, defining the design principles and technical specifications for future design and privatisation process. He has analysed quality of power supply for connection of AC and DC unbalanced load to power network and published papers on practical implementation. Vukan carried out feasibility studies on reactive compensation (SVC and MSC) focusing on voltage variation and harmonic distortion issues.

Vukan has performed technical and economic evaluations, cost benefit net present value analysis, of various transmission and distribution schemes and electrical equipment. He carried out a number of asset evaluation analysis on electrical equipment and published papers on asset management, reliability and maintenance. He has performed equipment assessment and residual life prediction as part of strategic asset management analysis for a major underground transportation company in Asia. His duties have also included equipment arrangement optimisation in particular reliability aspect in terms of failure rate and financial consequences as non-supplied energy to the consumers.

This training course has a limited attendance for up to 20 participants only.

Sessions commence at 9am on all days, with short intervals at 10.30am and 3.30pm respectively. Refreshments will be provided in the short intervals.
Lunch will be provided at 12:30pm for 1 hour. Sessions will end at 5pm on all days.
Courses Available

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<th>4 Pillars of Transformer Condition</th>
<th>Making IPP &amp; Renewable Energy Projects Contract</th>
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<tbody>
<tr>
<td>Advanced Project Finance for Power</td>
<td>Frameworks Bankable</td>
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<tr>
<td>Advanced Technical Report Writing &amp; Presentation Skills</td>
<td>Managing Complex Projects for Power and Utilities Professionals</td>
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<tr>
<td>Advanced Turnaround Shutdown &amp; Outage Management</td>
<td>Medium Voltage &amp; High Voltage Switchgear</td>
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<td>Ancillary Services in Competitive Electricity</td>
<td>Metallurgy for Engineers</td>
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<tr>
<td>Asset Management for the Power Industry</td>
<td>Mechanical Engineering for Non-Mechanical Engineers</td>
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<td>Best Practice Renewable Energy Capital &amp; Project Management</td>
<td>Mini Hydro Project Analysis</td>
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<td>Biomass Power Generation</td>
<td>MKV Speedtronic Control System</td>
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<td>CFB Combustion for Boiler Operations</td>
<td>MK VI Speedtronic Control System</td>
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<td>Clean Development Mechanism and Carbon Markets</td>
<td>Nuclear Energy Project Planning &amp; Economics</td>
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<tr>
<td>Coal Contracts</td>
<td>Nuclear Power</td>
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<tr>
<td>Combined Cycle Power Plants Operation</td>
<td>Offshore Platforms Electrical Systems Design &amp; Illustrations</td>
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<td>Combined Heat &amp; Power (CHP) and Co-Generation Plant Operations</td>
<td>Operations of Coal Fired Power Plants</td>
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<td>Competency Management System for the Power Industry</td>
<td>Power Generation Commissioning, Operations &amp; Maintenance</td>
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<td>Design &amp; Operations of Circulating Fluidized Bed Boiler</td>
<td>Power Generation Operation, Protection &amp; Excitation Control</td>
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<td>Developing &amp; Structuring Public-Private Partnership (PPP) for Infrastructure</td>
<td>Power Plant Chemistry for Chemist &amp; Chemical Engineers</td>
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<td>Effective Tender Process Management for Power &amp; Utilities</td>
<td>Power Purchase Agreements</td>
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<td>Electrical Hazop (eHazop) Studies for the Power Industry</td>
<td>Process Control Methods</td>
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<td>Electricity Demand-Side Management</td>
<td>Programmatic CDM</td>
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<td>Electricity Industry Design</td>
<td>Project Management for Power and Utilities</td>
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<td>Electricity Network Planning</td>
<td>Relay Protection in Power Systems</td>
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<td>Electricity Retail Contracts</td>
<td>Reliability Centered Maintenance Masterclass</td>
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<td>Electricity Theft</td>
<td>Reliability Engineering</td>
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<td>Electricity Trading Essentials</td>
<td>Renewable Energy Development &amp; Investment</td>
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<td>Energy Efficiency</td>
<td>Renewable Energy Integration</td>
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<td>EPC Contract Management for Power &amp; Utilities</td>
<td>Risk Based Inspection</td>
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<td>Essentials of Coal Markets and Trading</td>
<td>Risk Management in Power Markets</td>
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<td>Essentials of Power Trading</td>
<td>Root Cause Analysis</td>
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<td>Excitation Systems</td>
<td>Rotating Equipment Maintenance &amp; Reliability</td>
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<td>Feed-In Tariffs for PV Systems</td>
<td>Excellence</td>
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<td>Finance for Non-Finance Professionals in Power &amp; Utilities</td>
<td>SCADA &amp; Power Systems</td>
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<td>Financial Modelling for Project Finance in Power &amp; Utilities</td>
<td>Smart Grid</td>
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<td>Fitness-For-Service AP1 579 &amp; High Energy Piping Life Management</td>
<td>Solar Energy &amp; Photovoltaic Power</td>
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<td>Fundamentals of Geothermal Energy</td>
<td>Spare Parts Optimisation</td>
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<td>Fundamentals of Power Generation</td>
<td>Supercritical and Ultra-Supercritical Coal-Fired Power Plant</td>
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<td>Gas &amp; LNG Contract Negotiation</td>
<td>Technical Report Writing &amp; Presentation Skills for Power &amp; Utilities Professionals</td>
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<td>Gas Turbine Generator Selection, Operation &amp; Maintenance</td>
<td>Ultra Low NOx Gas Turbine Combustion</td>
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<td>Gas Turbine Hot Gas Paths, Rotors &amp; Failure Analysis</td>
<td>Uninterruptible Power Supply</td>
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<td>Gas Turbine Major Inspection &amp; Overhaul</td>
<td>Vibration Analysis &amp; Condition Monitoring</td>
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<td>GE Gas Turbine Operations Simulation Based</td>
<td>Waste to Energy Plant Operations</td>
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<tr>
<td>HRSG Design, Operations &amp; Understanding, Controlling of HRSG Damage Mechanisms</td>
<td>Water Treatment and Corrosion Control for Steam Generation and Power Production</td>
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<td>HV Substation Design &amp; Construction</td>
<td>Writing Effective Standard Operating Procedures (SOP)</td>
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<td>IEC for Utilities</td>
<td>for Power &amp; Utilities Professionals &amp; Engineers</td>
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<td>Integration of Distributed Generation</td>
<td>LNG Marketer &amp; SPOT Trading</td>
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<td>Introduction to Carbon Capture &amp; Storage</td>
<td>Maintenance Planning &amp; Scheduling</td>
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<td>Introduction to Clean Coal Technology</td>
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<td>Introduction to Power Systems</td>
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<td>Keeping Electrical Switchgear Safe</td>
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<td>Leadership &amp; Team Dynamics for Power &amp; Utilities</td>
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<td>LNG Fundamentals</td>
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<td>LNG Markets &amp; SPOT Trading</td>
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<td>Maintenance Planning &amp; Scheduling</td>
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www.poweredgeasia.com
Frequently Asked Questions (FAQs)

1. Does PowerEdge have other programmes than those listed?
   We have more than 200 programmes that we are capable of running. All we need is for you to contact us and request for the preferred programme and we will able to develop it.

2. Where is PowerEdge based?
   PowerEDGE is headquartered in Singapore but we run our training programmes in different venues around Asia.

3. What does PowerEdge do?
   We are a Power & Utilities Training Specialist.

4. Can this course be done in our city?
   It absolutely can. Get in touch with us to request for a training programme to be carried out in your city.

5. Can you reduce the price of our preferred course?
   While our price has been reduced before it is even launched, we are always happy to help you with further discounts.

6. Can you change the dates of the course?
   If you have a special requested date, let us know and we will arrange another session for you.

7. Who are the companies that will be participating?
   This varies from a diversity of Power Operators, Regulators, Financiers, to Vendors in the Power & Utilities industry.

8. Where is the venue for the course?
   We usually engage a 4 to 5 star hotel meeting room to ensure the comfort of our participants.

9. How many delegates should we expect for each course?
   This varies from 15 to 20 participants. Class sizes are kept small to allow trainers to focus better on each participant.

10. What are the different payment modes?
    We accept Visa/MasterCard, cheques, bank transfers and cash on site.

11. Is accommodation included when I sign up for a course?
    Accommodation is not included in the course fee but we are always happy to advise on available accommodations.

12. Can I get a cheaper accommodation through PowerEdge?
    We will be pleased to help you negotiate a better rate with hotels.

13. Is lunch provided during the course?
    We provide lunch and 2 tea breaks every day during our training programmes.

14. Are the training materials included once I have signed up for a course?
    Yes, training and course materials are included in the course fee.

15. Will there be a certificate for the course?
    Yes, there will be a certificate of participation upon completion of a course.

16. Who are PowerEdge trainers?
    They are expert consultants and practitioners with many years of experience in the subject matter that they deliver on.

17. Are PowerEdge trainers competent?
    We have received numerous favourable feedbacks on our trainers from past participants.

18. Can PowerEdge assist with Visa travel applications?
    We can assist in advising you on the relevant procedure(s) and embassies/consulates that provide Visa for travel purposes.

19. Can we purchase training materials without attending a course?
    Unfortunately this option is not available as training materials are specially developed for courses.

20. Can course content be tweaked to cater to our needs?
    Of course! Just let us know your request and we will get the trainer to assist in carrying it out.
ADVANCED CABLES
20 – 22 MAY 2015, SINGAPORE

REGISTRATION FORM

<table>
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<tr>
<th></th>
<th>NORMAL PRICE</th>
<th>Early Bird Ends 31 March 2015</th>
<th>GROUP OF 3 or More</th>
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<tr>
<td>3 Day Programme</td>
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<tr>
<td></td>
<td>SGD 3, 300</td>
<td>SGD 3, 100</td>
<td>SGD 2, 800</td>
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<td>Per Participant</td>
<td>(*GST Exclusive)</td>
<td>Per Participant</td>
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<td>SGD 3, 531</td>
<td>SGD 3, 317</td>
<td>SGD 2,996</td>
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<td>Per Participant</td>
<td>(GST Inclusive)</td>
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ATTENDEE DETAILS

Name ................................................................................................................. Job title ...................................................................................................................
Tel ........................................................ Department ........................................ Email ...........................................................................................................................

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COMPANY DETAILS

Organisation name ................................................................................................ Industry ...................................................................................................
Tel .......................................................................................................................... Address ..................................................................................................................
Fax .......................................................................................................................... Postcode ...................................................................................................

PAYMENT POLICY

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to PowerEdge Pte Ltd payment terms.

* GST: Exclusive price is only applicable for overseas corporate customers subject to qualifying conditions.

ATTENDANCE CANCELLATIONS & SUBSTITUTIONS

Exclusive price is only applicable for overseas corporate customers subject to qualifying conditions.

4 ways to Register

- Online Web Registration
  - info@poweredgeasia.com
  - (65) 6741 9927
  - (65) 6747 8737

- On Site Training
  - Contact us today at info@poweredgeasia.com with your needs 100% fulfilled.
  - With a host of highly trained experts, we will be happy to customize your programme with your needs 100% fulfilled.

4 Easy Ways to Register

- Online: www.poweredgeasia.com
- Fax: (65) 6747 0775
- Tel: (65) 6741 9927
- By Telegraphic Transfer: Please quote AE1 with the remittance advise

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to PowerEdge Pte Ltd payment terms.

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PAYMENT POLICY

You may substitute delegates at any time. POWEREDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another POWEREDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (including day 7), no credits will be issued. In the event that POWEREDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future POWEREDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that POWEREDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit

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