Qualifed Electrical Contractors Registry  
c/o The Institution of Engineers, Singapore  
70 Bukit Tinggi Road, Singapore 289758  
Tel: 6469 5000 / 64611241 Fax: 6467 1108  
Email: qec@iesnet.org.sg

**Training on Design, Operating and Maintenance of Grid Connected Photovoltaic System**

*Organized by: Qualified Electrical Contractors Registry*

*Supported by: IES & ACES*

**Solar Radiation, Photovoltaic Technology**

Participants are encouraged to share their challenges and views in a confidential, risk-free setting where the Lecturers will be able to provide personal expert insights and advisory to identify reasons for setbacks and feasible solutions which can be applied immediately.

**At the end of the course, participants will:-**

- Attain better knowledge in operating and maintenance of Photovoltaic system focus.
- To Design, install, Test and Commission PV Systems.
- Develop a plan of action to address a complex Photovoltaic technology.
- Better awareness and confidence to discharge Photovoltaic operation responsibilities.
- Deploy a range of developed practical aspects of Photovoltaic management.
- Explore, analyse and develop systems and plans for mastery in Photovoltaic management.


### Course Information

<table>
<thead>
<tr>
<th>Dates</th>
<th>6 May 2017 (Sat)</th>
<th>13 May 2017 (Sat)</th>
<th>20 May 2017 (Sat)</th>
<th>22 May 2017 (Mon)</th>
<th>10 June 2017 (Sat)</th>
<th>(Practical Session)</th>
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</thead>
<tbody>
<tr>
<td>Venues</td>
<td>IES Green Building 70 Bukit Tinggi Road Singapore 289758</td>
<td>Singapore Polytechnic  (Practical Session)</td>
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<tr>
<td>Time</td>
<td>09:00-17:00 19:00-21:00 (22 May 2017)  09:00-12:00 (10 Jun 2017) (Practical session)</td>
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<td>Fees</td>
<td>SGD 833.00/pax (10% early bird discount) (IES/QEC/ACES/M&amp;ERE-RTO/SCEM Members) (before 17 Apr 2017 @ 17:00)</td>
<td>SGD 925.00/pax (IES/QEC/ACES/M&amp;ERE/RTO/SCEM Members)</td>
<td>SGD 1,135.00/pax (For non-members)</td>
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<td><em>all fees are inclusive of GST and lunch (halal)</em></td>
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**Registration Details**

Registration is on a 1st come 1st serve basis. Register early to avoid disappointment. Please fill up Course Registration form with payment. You may wish to email us at stanley.ho@iesnet.org.sg

Up to 40% funding is available. Please click [HERE](#) to for more information about IRAS Productivity and Innovation Credit Scheme

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Course Lecturers

1st Lecturer: Er. Chan Chee Hin

Er. Chan graduated from the University of Singapore with Bachelor of Electrical Engineering. He was also awarded Master in Building Science for his research work on lift system design. He is a registered Professional Engineer in Singapore and an EMA Licensed High Voltage Electrical Engineer.

He has been working as M & E consultant for many years since graduation. He has designed, supervised and commissioned many major electrical systems both in Singapore and overseas.

He is a member of the SPRING technical committee on “Electrical Installation” and participated in the preparation of the revised CP5 and the first Singapore Standard on PV installation (First amendment to Singapore Standard SS CP5:1998). He was a Principal Investigator for a government funded PV related project “Use of solar energy for automated greenhouse ventilation and supplementary lighting in cultivation of leafy vegetables”.

He is a technical assessor appointed by Singapore Accreditation Council to assess the facilities and technical capability of electrical laboratories which are applying for accreditation.

He was a Ngee Ann Polytechnic teaching award recipient. Currently he is the Deputy Director of Electrical Engineering Division of Ngee Ann Polytechnic.

In the 7 day course, Er. Chan will elaborate on Solar Radiation (Irradiance, Irradiation and peak sun hours, Solar Radiation data, Sun path diagram). Basic PV technology on Solar Cells (Spectral response, Effect of Temperature, Effect of parasitic resistance) Characteristic of a solar cell (fill factor and equivalent circuit, factors affect the performance, efficiency of solar cells). PV cells interconnection and module (Module and circuit design, Module structure, Hot-spot heating and bypass diode, Module protection).

2nd Lecturer: Dr. Jiang Fan

Dr. Jiang Fan, Ph.D, Msc, B.Sc., graduated from Electrical Engineering Department of Fuzhou University, China. He achieved MSc degree in Electrical Power Research Institute (EPRI) of China and Ph.D. in The Robert Gordon University, UK. Recently he is a senior lecturer in the school of Electrical and Electronic Engineering, Singapore Polytechnic. He is the course manager of Diploma in Clean Energy and has been involving the research and technical training in solar PV technology since 1998. His main areas include renewable energy (solar energy and wind energy), power system protection, power quality and high voltage engineering.

He was PI of EDB CERT project “Solar Photovoltaic Test-bed” in charge of design, installation, testing, commissioning and evaluating of 36 grid-tied PV systems from 2008 to 2011 and Co-PI of EDB CERP project “Development of an Integrated Solar Photovoltaic-Thermal (PV/T) Module for the Tropics” in charge of developing, testing and evaluating of new PV/T modules in the tropic region from 2009 to 2012. He also designed, tested and commissioned a 8.3kWp stand-alone PV system for an industrial project in 2012.

Currently, he is the PI of MOE TIF project “Development of Higher Efficiency Solar PV/Thermal (PV/T) Collector and System” from 2013 to 2015. He has conducted technical talks on solar PV technology to EMA, NEA, BCA, HDB and IET and published fifteen journal and conference papers in solar energy systems.
Mr. Eddie Lee graduated with Diploma in Electrical Engineering from Ngee Ann polytechnic and BSc (Hons) in Business management with the University of Bradford.

He is the Managing Director of Renewpowers Technologies Pte Ltd which provides design, engineering, installation, commissioning and maintenance of solar systems. He has over 10 years of experience in the solar industry. He is the Managing Director of Renewpowers Technologies Pte Ltd which provides design, engineering, supply, installation and maintenance of photovoltaic and solar thermal (hot water) systems. He has over 10 years of experience in the solar industry. His previous work experience includes 7 years in Building Management Systems and Intelligent Building Systems with Siemens. Eddie had contributed his time as solar trainer with SEAS, ITE, NEA & SEL. He was also a member of the Singapore Standards Council's Working Group of SS 601 : 2014 Code of Practice for Maintenance of Grid-Tied Solar Photovoltaic (PV) Power Supply System.

### PROGRAMME

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Programme</th>
<th>Lecturer</th>
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</thead>
<tbody>
<tr>
<td>6 May 2017</td>
<td>08:30 – 09:00</td>
<td>Registration</td>
<td>Er. Chan Chee Hin</td>
</tr>
<tr>
<td>(Sat)</td>
<td>09:00 – 12:00</td>
<td>Introduction of Photovoltaic Systems</td>
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<td></td>
<td>12:00 – 13:00</td>
<td>Lunch</td>
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<tr>
<td></td>
<td>13:00 – 17:00</td>
<td>Design of Photovoltaic Systems</td>
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<tr>
<td>13 May 2017</td>
<td>08:30 – 09:00</td>
<td>Registration</td>
<td>Dr. Jiang Fan</td>
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<tr>
<td>(Sat)</td>
<td>09:00 – 12:00</td>
<td>PV Cells and Modules &amp; Balance of System Part I</td>
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<td></td>
<td>12:00 – 13:00</td>
<td>Lunch</td>
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<tr>
<td></td>
<td>13:00 – 17:00</td>
<td>PV Cells and Modules &amp; Balance of System Part II</td>
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<tr>
<td>20 May 2017</td>
<td>08:30 – 09:00</td>
<td>Registration</td>
<td>Mr. Eddie Lee</td>
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<tr>
<td>(Sat)</td>
<td>09:00 – 12:00</td>
<td>Planning and Sizing PV Grid Tied System</td>
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<td>12:00 – 13:00</td>
<td>Lunch</td>
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<td></td>
<td>13:00 – 17:00</td>
<td>System Installation and Commissioning</td>
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<tr>
<td>22 May 2017</td>
<td>18:30 – 19:00</td>
<td>Registration</td>
<td>Mr. Eddie Lee</td>
</tr>
<tr>
<td>(Mon)</td>
<td>19:00 – 21:00</td>
<td>System Installation and Commissioning</td>
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<tr>
<td>10 June 2017</td>
<td>09:00 – 12:00</td>
<td>System Yield &amp; Performance and Operation/Maintenance (Practical session)</td>
<td>Mr. Leong Fai Choy</td>
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</table>
Registration

Please register online by Friday, 28 April 2017 17:00

Please visit https://form.jotform.me/70878202620453 to register online and transact your payment via Paypal.

- All fees payment via cheque
  Account payable/ crossed Cheque to ‘IEH-ACESing Joint Registry’ via post (At the back of your Cheque, please indicate your Name and contact number
  Postal Address:
  The Institution of Engineers, Singapore
  70 Bukit Tinggi Road, Singapore 289758
  Attention: Stanley Ho

- All fees payment via AXS
  AXS kiosks – All fees can be transacted via island-wide AXS kiosks.


  Please select/input/key in:
  Remarks: 6th Run PV course

  Please keep, retain and furnish your proof of payment(s), receipt(s) or e-receipt(s), if any, during registration.

Contact Person: Stanley Ho / Nellie Liu (e): stanley.ho@iesnet.org.sg; nellie.liu@iesnet.org.sg
(d): +65 6461 1241 / +65 6461 1247 (t): +65 6469 5000

Terms and Conditions for Registration

Registration will be on a first-come-first-served basis and will only be accepted upon the receipt of payment. Please notify us in writing of any change in your registration at least 7 days before the commencement date.

Confirmation of Registration

Confirmation of registration will be given 7 days before the commencement date via email. If you do not receive the said confirmation email, please contact Stanley/Nellie at Tel: 64611241/64611247.

Withdrawals/Refunds of Fees

Notice of withdrawal must be given in writing, policy on refund of course fee is as follows:

➢ FULL refund if we receive your written notice of withdrawal at least 7 days before the commencement date.

➢ NO refund otherwise.

➢ Participant who did not turn up would not be accepted as reason for withdrawal/ refund

➢ Replacement is allowed but restricted to once only. Replacement will be allowed only if written notice is received before the commencement date. However, when a member is replaced by a non-member, the participant has to pay the difference in the relevant fees.