



## PREPARATORY COURSE FOR PE FUNDAMENTALS OF ENGINEERING EXAMINATION (ELECTRICAL ENGINEERING)

PROGRAMME DETAILS	
<b>Date</b>	: 21 July 2014 - 15 August 2014
<b>Duration</b>	: 28 Hours (8 Sessions)
<b>Time</b>	: (Refer to Programme Schedule at Pg.3)
<b>Venue</b>	: 90 Stamford Road S(178903)
<b>CET accredited hours</b>	: 28 Hours
<b>Fees</b>	: \$1000.00 (IES Members) \$1200.00 (Non-Members)
<i>* Fees inclusive of 7% GST and course materials.</i>	
<i>* Certificate of Attendance will be issued to participants with at least 75% attendance.</i>	

### INTRODUCTION

An engineer applying for registration as a professional engineer, besides having to hold an approved degree or qualification listed in the Professional Engineers (Approved Qualifications) Notification or other proper and recognized academic qualifications in engineering and satisfies such conditions as the Professional Engineers Board, Singapore may determine and acquiring not less than 4 years' of relevant practical experience, is also required to sit and pass the Fundamentals of Engineering Examination and the Practice of Professional Engineering Examination.

This preparatory course will cover all the topics stipulated for the Fundamentals of Engineering Examination for Electrical Engineering and will be delivered by experienced professors and lecturers from tertiary educational institutions.

### OBJECTIVES

This preparatory course is aimed to help applicants in their preparation for the Fundamentals of Engineering Examination for Electrical Engineering by providing revision of all the topics stipulated.

## **COURSE TOPIC**

### ➤ **EE 101 Principles of Power Engineering**

- **Three-phase Circuits and Systems**  
Review of single-phase circuits. Three-phase voltage generation. Phasor diagrams. Wye and delta connections. Balanced three-phase loads. Active, reactive and apparent power. Power measurements. Power factor correction.
- **Magnetism and Magnetic Circuits**  
Magnetic fields. Magnetic materials and magnetization curves. Magnetic equivalent circuits. Electromagnetic induction. Sinusoidal excitation. Magnetic losses.
- **Transformers**  
Ideal transformer. Equivalent circuits. Phasor diagrams. Determination of parameters. Performance evaluation. Autotransformers. Three-phase transformers.
- **Fundamental of Power System**  
Energy sources. Per unit system. Power system components and representation: synchronous generators, transmission lines and cables. Load representations. Power transfer.
- **AC and DC Machines**  
DC Machines: operating principle, voltage and torque equations, classification, torque-speed characteristics, losses and efficiency. Three-phase induction motors: operating principle, equivalent circuit, torque-speed characteristics, losses and efficiency.
- **Power Electronics and Drives**  
Introduction to power conversion. Harmonics. AC to DC conversion. DC to DC conversion. DC to AC conversion. DC servo motor drive systems. AC variable-speed induction motor drive systems. Permanent magnet and stepping motor drive systems.
- **Power Flow Modelling**  
System components modelling. Formulation of power flow equations. Methods of power flow solution. Case studies.
- **Active Power and Frequency Control**  
Governor control systems. Area control errors and load frequency control. Energy offers. Transmission losses, penalty factors and loss coefficients. Economic dispatch. Automatic generation control. Electricity market environment. Active power control devices.

### ➤ **EE 201 Power System Analysis and Utilizations**

- **Reactive Power and Voltage Control**  
Production and absorption of reactive power. Methods of voltage control. Reactive power and voltage control devices. Application to transmission and distribution systems.
- **Analysis of Unsymmetrical Faults**  
Three-phase faults and fault level calculations. Symmetrical components. Sequence impedances and sequence networks. Unsymmetrical faults.
- **Electric Power Distribution Systems**  
Distribution system configurations. Primary and secondary distribution. Ring, radial and inter-connected systems. Distribution substation layout. Planning criteria and network design. Fault diagnosis and restoration of supply. Expert system applications.

- Building Services Engineering  
Estimation of power demand. LV cables and busway systems. Conductor sizing factors. Circuit protective conductor. Earth leakage and touch voltage. Inspection and testing. Lightning protection.
- General Protection Principles  
Basic protection principles Instrument transformers. Coordination of overcurrent and earth protection for distribution systems. Pilot-wire differential protection of feeders.
- Applications of High-voltage Engineering  
Acceptance and routine tests on apparatus. Fault locating methods. Condition monitoring and aging assessment. Case studies.

### **PROGRAMME SCHEDULE**

<b>Date</b>	<b>Time</b>	<b>Module</b>	<b>Lecturers</b>
21 July 2014 (Mon)	6.30pm - 10.30pm	EE 101 Principles of Power Engineering	Wang Youyi
23 July 2014 (Wed)	6.30pm - 8.30pm		
25 July 2014 (Fri)	6.30pm - 10.30pm		
30 July 2014 (Wed)	6.30pm - 9.30pm	EE 101 Principles of Power Engineering	Govinda Bol Shrestha
31 July 2014 (Thurs)	6.30pm - 9.30pm		
11 August 2014 (Mon)	6.30pm - 10.30pm	EE 101 Principles of Power Engineering	A I Maswood
13 August 2014 (Wed)	6.30pm - 10.30pm	EE 201 Power System Analysis and Utilizations	Wang Peng
15 August 2014 (Fri)	6.30pm - 10.30pm		

*\*Subjected to minor changes once the university teaching schedules are out in July.*

### **CV OF SPEAKERS**

#### **Dr. Govinda Bol Shrestha**

*Associate Professor*

*Nanyang Technological University*

*EEE/Division of Power Engineering*

Dr. Govinda Bol Shrestha, born and raised in Kathmandu Nepal, received B.E.(Honors) degree in EE from Jadavpur University (India) in 1975, MBA from University of Hawaii in 1985, MS in Electrical Power Engineering from RPI, in 1986, and Ph.D. in Electrical Engineering from Virginia Tech, in 1990. He joined Nanyang Technological University, Singapore in 1992 where he is an Assoc. Professor and the Program Director of MSc (Power Engineering) program at present. He has taught courses covering wide ranging topics in power systems and has supervised a number of post-graduate students. His current research interests include power system operation & planning, power markets, alternate energy & distributed systems, and Flexible AC Transmission Systems. He has authored a number of publications in these fields. Dr. Shrestha provides consulting services to power related companies in ASEAN and has conducted numerous short-courses for training power engineers in the region – Indonesia, Malaysia, Singapore. Dr. Shrestha is a Senior member of IEEE and served as the Chairperson of IEEE Power Chapter Singapore (2000-2001).

**Dr. Wang Youyi**

*Professor*

*Nanyang Technological University*

*EEE/Division of Power Engineering*

Dr. Wang Youyi received his PhD degree from the University of Newcastle, Australia, in 1991, in electrical engineering. Currently he is an associate professor in the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. Dr. Wang has more than 20 years teaching experience. Since he joined Nanyang Technological University in 1991, Dr. Wang has taught many subjects in the area of power systems, circuit analysis, DC and AC circuits, Control, etc. in both undergraduate and postgraduate levels. Dr. Wang has supervised and is supervising seven research fellows and twenty-six postgraduate students, eleven of whom have been awarded Ph. D. degrees and six M. Eng. degrees. Currently, Dr Wang is senior members of IEEE Control Systems Society and IEEE Power Engineering Society and Treasurer of IEEE Singapore Control Systems Chapter.

**Dr. Ali Iftekhar Maswood**

*Associate Professor*

*Nanyang Technological University*

*EEE/Division of Power Engineering*

Dr. Ali Iftekhar Maswood obtained his B & M. Eng. Degree with first class from Moscow Power Engineering Institute, and Ph. D. from Concordia University, Montreal, Canada. Having taught in Canada for a number of years, he joined Nanyang Technological University, Singapore in 1991 where currently he is an Associate Professor. Dr. Maswood's research interest is in Power Electronics, particularly in Converter generated harmonics, Unity Pf converter, Novel Inverter topology, advanced PWM switching, and Power quality. He has authored numerous referred IEEE/IEE transaction/Journal and Conference publications on these topics. His work in 'FROSIN' switch mode power supply gave rise to several Singapore patents. He is a senior member of IEEE, actively involved in the local IAS/PELS chapter and in the steering committee of the IEEE Power Electronics & drives (PEDS) conference. He is also the chapter-author "Power Electronics, Handbook", published by academic press, San Diego U.S.A, 2002.

**Dr. Wang Peng**

*Associate Professor*

*Nanyang Technological University*

*EEE/Division of Power Engineering*

Dr. Wang Peng received his B.Sc. degree from Xian Jiaotong University, China, in 1978, the M. Sc. degree from Taiyuan University of Technology, China, in 1987, and the M. Sc. and Ph.D. degrees from the University of Saskatchewan, Canada, in 1995 and 1998, respectively. Currently, he is an associate professor of Nanyang Technological University, Singapore. Dr Wang has thirty years teaching and research experience in Electrical and Electronic Engineering in different counties such as China, Canada and Singapore.

# Registration Form

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Date : 21 July 2014 – 15 August 2014  
Time : (Refer to Programme Schedule at Pg.3)  
Venue : 90 Stamford Road S(178903) (To Be Confirmed)  
CET accredited hours : 28 Hours  
Fees \* : \$1000.00 (IES Members) \$1200.00 (Non-Members)

Please register online/fax the completed form **by 14 July 2014 before 3pm** to:

**Zhi Ying**  
IES Academy  
70 Bukit Tinggi Road(289758)  
Tel: 6463 9211 Fax: 6463 9468

### Participant Details

Name : \_\_\_\_\_ NRIC : \_\_\_\_\_

Company : \_\_\_\_\_ Designation: \_\_\_\_\_

Address 1 : \_\_\_\_\_  
(For mailing of invoice and receipt)

Address 2 : \_\_\_\_\_  
(For mailing of Certificate)

Postal Code : \_\_\_\_\_ Sex : \_\_\_\_\_ Male / Female \_\_\_\_\_

Mobile No. : \_\_\_\_\_ Fax : \_\_\_\_\_

Email : \_\_\_\_\_  
(For sending of confirmation email)

Please indicate :  IES members IES M'ship No.: \_\_\_\_\_ P.E. No.: \_\_\_\_\_ (if applicable)  
 Non-members  Vegetarian

### Contact Person Details (if different from participant)

Name : \_\_\_\_\_ Designation: \_\_\_\_\_

Tel : \_\_\_\_\_ Fax: \_\_\_\_\_

Email : \_\_\_\_\_

### Payment Details

Bank / Cheque No.: \_\_\_\_\_ Amount (\$): \_\_\_\_\_

Sponsored by company

\* All Fees are inclusive of 7 % GST.

Cheque should be made payable to: "IES".

### Acceptance of Terms and Conditions for Registrations of IES Academy's Events

I agree to abide by the Terms and Conditions for Registration of IES Academy's Events.

Name : \_\_\_\_\_ Signature : \_\_\_\_\_

## **TERMS & CONDITIONS COURSE REGISTRATION**

### **Registration**

Registration can be done either online or by faxing in the registration form.

Any registration, whether on-line or fax will be on a ***first-come-first-served basis*** and will only be confirmed upon receipt of full payment by The Institution of Engineers, Singapore (IES).

Email and phone registrations will not be accepted.

### **Closing Date & Payment**

The closing date of the event will be 7 days prior to event commencement date. Cheques should be crossed 'A/C payee only' and made payable to 'IES', with the ***Date of event, Title of The Event and participants' name indicated clearly on the back of the cheque***, and post to:

**IES Academy  
70 Bukit Tinggi Road  
Singapore 289758**

### **Confirmation of Registration**

Confirmation of registration will be given 7 days prior to the commencement date of event via email. If you do not receive the said confirmation email, you are required to contact IESA general admin immediately at 6463 9211 (office).

IESA reserves the right to allow only confirmed and paid registrants to attend the Event.

### **Withdrawals/Refunds of Fees**

Notice of withdrawal must be given in writing to IESA. 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 of the Event.
- **NO** refund otherwise.

No show of participant 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 by us at least 3 working days before the commencement of the event. However, when an IES member is replaced by a non-member, the participant has to pay the difference in the relevant fees.

### **Cancellation/Postponement**

Changes in Venue, Dates, Time and Speakers for the Events can occur due to unforeseen circumstances. IESA reserves the full rights to cancel or postpone the Event under such circumstances without prior reasons. Every effort, however, will be made to inform the participants or contact person of any cancellation or postponement.

Fees will be refunded in FULL if any Event is cancelled by IESA.

### **Enquiries**

For further enquiries, please contact IESA general office at Tel: 6463 9211.