70% - 90% SkillsFuture funding is available to eligible Singaporeans and PRs*

SIT@Dover, 10 Dover Drive S138683

OVERVIEW

Smart grids revolutionise electricity generation, distribution, and consumption by utilising real-time data, advanced analytics, and intelligent automation.

This transformation empowers utility companies, businesses, and consumers to optimise energy usage, enhance grid reliability, and reduce environmental impact. In addition to improving operational efficiency and resilience, smart grids pave the way for greater integration of renewable energy sources, energy storage systems, and electric vehicles, which creates a more sustainable and resilient energy ecosystem.

To support the Singapore Energy Transition, skilled professionals in smart grid technologies are in demand. These capabilities are essential for developing smart grid infrastructure and services, addressing the rising demand for electricity and the increasing use of distributed energy resources like solar and Energy Storage Systems (ESS).

This 5-day intensive course is designed to equip professionals with a deep understanding of smart grids and their integration with key technologies such as Advanced Metering Infrastructure (AMI), integration of distributed resources, microgrids, electricity markets, cybersecurity, and the Internet of Things (IoT). Learners will develop a holistic understanding of the entire system, integrating the interrelated sub-sectors of solar, ESS, electricity imports, and smart grids.

WHO SHOULD ATTEND?

- Engineers with a background in electrical or renewable energy engineering
- Professionals working in the energy and utility sectors, which include:
    - Grid and energy system operators
    - Energy planners and analysts
    - Renewable energy project managers
    - IoT and communication technology specialists
    - Policymakers and regulators in the energy industry

WHAT YOU WILL LEARN

- Apply fundamental smart grid principles to enhance grid reliability and efficiency
- Assess the role and impact of AMI in modern energy systems
- Demonstrate an understanding of smart grid architecture and its integration with communication networks
- Evaluate interconnections and interoperability requirements for integrating distributed resources in microgrids
- Analyse the impact on electricity market dynamics

Utilise tools to assess cybersecurity vulnerabilities in smart grids

COURSE INSTRUCTORS

Dr Sivaneasan

Associate Professor, Engineering, Singapore Institute of Technology

Dr. Sivaneasan received the B.Eng. and Ph.D. degrees in Electrical and Electronic Engineering from Nanyang Technological University, Singapore, in 2007 and 2012 respectively. In 2011, he joined the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, as a Research Engineer and subsequently as a Research Fellow until 2015. He then joined Nanyang Polytechnic as a Lecturer in 2015. In 2019, he joined Singapore Institute of Technology as an Assistant Professor. Dr Sivaneasan conducted research and development in the areas of power engineering in particular microgrids and smart grid technologies. Till date, Dr Sivaneasan has gathered more than ten years of lecturing, tutoring and laboratory supervision experience in numerous electrical engineering modules. He is also a recognized Associate Adult Educator under the Institute for Adult Education. He has taught various industry relevant Continuing Education and Training (CET) programs for working adults and foreign participants.

Dr. Kerk See Gim

HOD for Sustainability & Energy Solutions, Power Automation Pte Ltd

Dr. Kerk obtained his bachelor's in 1999, his master's in 2002 from the NUS, and, subsequently, his PHD from SUTD in 2020. He started as a SCADA EMS engineer in Power Automation, a joint venture between Singapore Power Group and Siemens AG, and has been involved in the power industry ever since. He has been involved in smart metering and power system control systems to support proper management of the electrical network for Singapore Power's (SP) transmission and distribution (T&D) network. Similarly, he is involved in

many of the solutions provided to the regional utilities by Taiwan Power Company, Formosa Taiwan, TNB Malaysia, Meralco Philippines, PEA/MEA Thailand, PLN Indonesia, and even in the Middle East.

One of his key responsibilities involves monitoring the Quality of Supply (QoS) for key customers across key transmission and distribution substations, including those that supply to large critical customers such as wafer fabs, airports, large industrial plants, and key government installations. More recently, he has also been involved in integrating many of the renewable energy projects, smart homes, and energy storage systems implemented by the grid. His recent publications and work focus on microgrids, non-intrusive load management (NILM), smart distribution boards, and condition monitoring.

COURSE INSTRUCTORS

Lim Chern Yuen

Senior Economist, Energy Market Company (EMC) Pte Ltd

Chern Yuen is a senior economist within the Energy Market Company (EMC), a fully owned subsidiary of SGX. As part of the market administration team, he is responsible for proposing rule changes to evolve the market design for the National Electricity Market of Singapore (NEMS), and he is currently working on issues related to energy storage systems, demand response, and large-scale imports. He is also part of the training team at EMC, providing industrial training to industry players, market operators, regulators, and academics.

Previously, as a consultant at Frontier Economics, Chern Yuen was tasked with conducting robust analysis to formulate data-backed recommendations across a wide range of industries, including energy, transport, and water.

Li Zhenhui

Chief Economist, Energy Market Company Pte Ltd

Zhenhui is the chief economist of the Energy Market Company (EMC), a fully owned subsidiary of SGX. He has over 10 years of experience in the energy and power sector in Singapore. He first worked as a regulator in the gas and electricity sectors and later as an economist with the Electricity Market Company. In 2020, as the appointed Chairman of Industrial Working Group 1, he created and submitted an industry-endorsed recommendation report to Singapore's regulator on the proposed forward capacity market.

Now he advises the rule change panel on industry proposals that enhance the reliability, efficiency, and transparency of the SWEM. He is also in charge of the training team at EMC,

which provides industrial training to both local and overseas industry players, market operators, regulators, and academics. He specialised in energy policy, energy market surveillance, statistical data analysis and modelling, predictive modelling, business intelligence, and project management.

COURSE SCHEDULE

SCHEDULE	TOPIC
DAY 1 **(10 JUL 2024)**	**Introduction to Smart Grids** ▪ An overview of power systems ▪ Components of smart grids ▪ Architecture and design principles **AMI** ▪ Substation automation and Supervisory Control and Data Acquisition (SCADA) systems ▪ Role of AMI in smart grids ▪ AMI technologies and implementation
DAY 2 **(11 JUL 2024)**	**Interconnections in Smart Grids** ▪ Integration of distributed resources ▪ Grid stability and control requirements **Smart Grids Interoperability** ▪ Communication protocols in smart grids ▪ Interoperability standards and frameworks ▪ Regulatory landscape and policy implications
DAY 3 **(12 JUL 2024)**	**National Electricity Market** ▪ Overview of electricity markets ▪ Pricing mechanism and economic dispatch ▪ National Electricity Market of Singapore (NEMS) and **Market Operation in Smart Grids** ▪ Role of smart grids in market operations ▪ Demand response and dynamic pricing ▪ Case studies: Demand response in Singapore
DAY 4 **(15 JUL 2024)**	**Smart Grids Cybersecurity Risks** ▪ Introduction to smart grids cybersecurity ▪ Cybersecurity standards and regulations ▪ Key components of smart grid cybersecurity **Securing Smart Grids** ▪ Intrusion detection and prevention in smart grids ▪ Secure communication networks in smart grids

	▪ Future trends and emerging technologies
DAY 5 **(16 JUL 2024)**	**Visit to the Singapore Power Grid Control Centre / SP HQ (training school)** ▪ Emerging trends and the future directions of smart grids ▪ Q&A ▪ Class assessment

CERTIFICATE AND CONTINUING PROFESSIONAL DEVELOPMENT

A Certificate of Participation will be issued to participants who:

- Undertake non-credit bearing assessment during the course
- Attend at least 75% of the course

This workshop is eligible for the following continuing professional development units:

- **40 SCEM PDUs to be awarded**
- **TBC PDUs awarded by PEB Singapore**

COURSE FEES

SkillsFuture funding is available for eligible Singaporeans and Singapore PRs. Terms and Conditions apply.

Category	Full Fee	After SF Funding
Singapore Citizen (Below 40)	~~$5,450.00~~	$1,635.00
Singapore Citizen (40 & above)	~~$5,450.00~~	$635.00
Singapore PR/LTVP+ Holder	~~$5,450.00~~	$1,635.00
Non-Singaporeans	$5,450.00	Not Eligible

Note:

- All figures include GST. GST applies to individuals and Singapore-registered companies.
- You can opt for either SF Series Funding or Mid-Career Enhanced Subsidy. Both cannot be combine.

SCAN QR CODE TO REGISTER & FIND OUT MORE ABOUT THE COURSE

SIT reserves the right to make changes to published course information, including dates, times, venues, fees and instructors without prior notice