

Name	Dr. Shady Khalil
Institution	Texas A&M University at Qatar
Period of the visit	June 10, 2019 – June 15, 2019
Title of the lecture	Grid Modernization; Complexity, Barriers and Opportunities.
Short description of the lecture	The architecture of the current power grid is of high complexity with many challenges that have to be considered on both demand-side and supply-side. Grid modernization is vital to deliver multiple benefits to utility providers and customers. Also, the modernized grid control and management play a crucial role in reducing energy consumption and improving the power reliability, efficiency, and quality. This course will focus on grid modernization complexity, barriers and opportunities in addition to the network architecture and the transition towards smart grids. This course has been designed to provide students with the knowledge and understanding of the strategies, technologies, actions, applications and different solutions to achieve grid modernization and transformation to smart grid.
Syllabus of the lecture	<ol style="list-style-type: none"> 1. Grid Modernization; Complexity, Barriers and Opportunities. 2. Monitoring, Operating and Controlling the Modernized Grid 3. Self-healing and Grid Optimization; Concept, Capabilities; Technologies, and Challenges. 4. Integrated Demand Side Management. 5. Smart Grid Resilience and Reliability. 6. Digital Substation – Case Study. 7. Incipient Faults Detection and Diagnosis in Industry.

Dr. Shady Khalil is an Assistant Research Scientist in the Department of Electrical and Computer Engineering, Texas A&M University at Qatar, a member of the Institute of Electrical and Electronic Engineers (IEEE), a member of The Institution of Engineering and Technology (IET), a member of the Smart Grid Center – Extension in Qatar (SGC-Q). Shady has worked with industry for over twelve years as electrical design engineer. He has published over fifty journal and conference papers. His research interests include electrical machines, power system, smart grid, energy management system, reliability of power grid, fault detection, and condition monitoring in conjunction. Dr. Shady is a principal investigator and a leader in many potential research projects.



Selected papers:

- 1- Amira Mohammed, **Shady S. Refaat**, Sertac Bayhan, Haitham Abu-Rub, "Microgrid Control and Management Strategies Evaluation and Review", *IEEE Power Electronics Magazine*. (Accepted)
- 2- Krama, Abdelbasset, Laid Zellouma, Boualaga Rabhi, **Shady S. Refaat**, and Mansour Bouzidi. "Real-Time Implementation of High-Performance Control Scheme for Grid-Tied PV System for Power Quality Enhancement Based on MPPC-SVM Optimized by PSO Algorithm." *Energies* 11, no. 12, 2018.
- 3- Qasim Khan, **Shady S. Refaat**, Haitham Abu-Rub, Hamid Toliyat, "Partial Discharge Diagnosis in GIS: State-of-Art", *IEEE Electrical Insulation Magazine*. (Accepted).
- 4- Mohamed Amine Fnaiech, Mohamed Trabelsi, **Shady S. Refaat**, Hazem Numan Nounou, Haitham Abu-Rub, "Robust Sliding Mode Control for Three-Phase Rectifier Supplied by Non-Ideal Voltage", *Control Engineering Practice*, 2018.
- 5- **Shady S. Refaat**, Haitham Abu-Rub, Amira Mohamed "Transient Analysis and Simulation of a Grid Integrated large-scale Photovoltaic (PV) Energy System, article in Qscience journal, Vol. no. 2, 2017.
- 6- **Shady S. Refaat**, Haitham Abu-Rub, Antonio P. Sanfilippo, Amira Mohamed, "Impact of grid-tied large-scale photovoltaic system on dynamic voltage stability of electric power grids", *IET Renewable Power Generation*, 2017.
- 7- **Shady S. Refaat**, Haitham Abu-Rub, "Smart Grid Condition Assessment: Concepts, Benefits, and Developments", *Power Electronics and Drives*, Vol. 1, no. 2, pp. 147-163, 2016.
- 8- A. SK, Moin, H. Abu-Rub, **Shady S. Refaat**, Iqbal, "Diagnosis of Stator Turn- to-Turn Fault and Stator Voltage Unbalance Fault Using ANFIS", *International Journal of Electrical and Computer Engineering (IJECE)*, Vol: 3, No: 1, 2013.

Dr. Shady Khalil		Texas A&M University at Qatar		Smart Grid Center – Extension in Qatar			
10-14 June 2019				15 hours of lectures			
Title of the lecture		Grid Modernization; Complexity, Barriers and Opportunities					
Lecture room		E41		The main building of the Electrical and Control Engineering Faculty (WEiA)			
May							
	10	11	12	13	14	15	16
Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
7.00-8.00							
8.00-9.00							
9.00-10.00							
10.00-11.00							
11.00-12.00							
12.00-13.00		Lecture		Lecture			
13.00-14.00		12:15 - 15:00 (breaks 2x15 min.)		12:15 - 15:00 (breaks 2x15 min.)			
14.00-15.00	Lecture		Lecture				
15.00-16.00	14:15 - 17:00 (breaks 2x15 min.)		14:15 - 17:00 (breaks 2x15 min.)		Lecture		
16.00-17.00					15:15 - 18:00 (breaks 2x15 min.)		
17.00-18.00							
18.00-19.00							
19.00-20.00							
20.00-21.00							