

# One Week Course on Cyber-security Control and Sensing Technology for Future Smart Grids

May 23, 2022 to May 27, 2022

Jamia Millia Islamia, New Delhi, INDIA



جامعہ ملیہ اسلامیہ  
جامیہا میلیہا اسلامیہ

Jamia Millia Islamia  
A Central University  
(NAAC Accredited A++ Grade)



Course will be delivered  
in virtual mode

## SPEAKERS

**PROF. JAHANGIR HOSSAIN**  
UNIVERSITY OF TECHNOLOGY,  
SYDNEY, AUSTRALIA

&

**PROF. TARIKUL ISLAM**  
Jamia Millia Islamia  
(Course Coordinator)

## Lecture-wise Course Plan

Monday, May 23, 2022

Lecture 1-2: 10:30am -  
12:30pm- (IST)

Jahangir Hossain

Lecture 3-4: 2:30pm - 4:30pm -  
Tarikul Islam

Tuesday, May 24, 2022

Lecture 5-6: 9:30 am-11:30 am

Tutorial 1: 11:30 am - 12:30pm

Jahangir Hossain

Lecture 7-8: 2:30pm - 4:30 pm-  
Tarikul Islam

Wednesday, May 25, 2022

Lecture 9-10: 9:15am- 11:15am

Tutorial 2: 11:30 am - 1:00 pm

Jahangir Hossain

Thursday, May 26, 2022

Lecture 11-12:

9:30am-11:30am,

Jahangir Hossain

Lecture 13:

11:30am - 12:30pm

Tutorial 3: 2:30 pm - 4:30 pm

Tarikul Islam /

Anwar Ullah Khan

Friday, May 27, 2022

Lecture 14-15:

9:30am - 11:30am

Jahangir Hossain

Lecture 16: 11:30am -12:30 pm  
Tarikul Islam

Exam & Evaluation:

2:00 pm - 3:00 pm

Valedictory Session:

4:00 pm - 5:00 pm

## About the Course

Cyber-attacks can interfere either directly or indirectly with monitoring and control in power systems, leading to cascading failures and blackouts. As the electricity grid becomes increasingly distributed and reliant on emerging telecommunication and control technologies (e.g., 5G wireless and narrowband internet of technology (IoT) networks), vulnerabilities to cyber-attacks will increase, and more sophisticated approaches to intrusion detection and management will be required, e.g., approaches that can also differentiate between cyber-attacks and other natural disruptions to normal operation. Recently as per Hindustan Times Report dated April 08, 2022, Chinese hackers targeted 7 Indian power hubs. Therefore, the grids in developing countries will require highly reliable secure control as they will be more prone to threats.

To accommodate cyber-secure control and required sensing technology, a huge adequately trained workforce shall be required in the future power industry. The electrical engineer who works in the interdependent critical power, communication and electrified transportation sectors will encounter challenging problems in designing future networks to deliver an increasing amount of electrical energy in a safe, reliable and resilient manner. Another important challenge for the electrical engineer is to develop smart and reliable sensors for implementing cyber-secure control for the future smart electricity grids.

Therefore, this course will be delivered to train students/engineers with the knowledge and skills necessary for designing and implementing cyber-secure control strategies for the future smart power networks. Students/engineers will be provided an opportunity to learn the advancement of sensing technology; important sensing parameters, low-cost fabrication based on flexible electronics, and interfacing of the sensor and conditioning of the sensing signal. The attendee will also acquire extensive coherent advanced knowledge of designing, fabrication and implementation of smart and reliable sensors for improving cyber security of smart grids (SG).

This course is different from other existing courses related to smart grids as it will mainly focus on the identification of cyber-attacks based on power system behaviors, and links cyber-security and robust control in single framework. Participants will also know about the sensing devices and challenges to design the sensors for smart grid applications. Participants will receive tutorial about the modelling of cyber security system and practical exposure of design and fabrication of some sensors. This is research cum higher undergraduate level course and it is interdisciplinary in nature.



**Jahangir Hossain** (M'10-SM'13) received the B.Sc. and M.Sc. Eng. degrees from Rajshahi University of Engineering and Technology (RUET), Bangladesh, in 2001 and 2005, respectively, and the Ph.D. degree from the University of New South Wales in 2010, Australia, all in electrical and electronic engineering.

He is currently an Associate Professor with the School of Electrical and Data Engineering, University of Technology, Sydney, Australia. Before joining there, he served as an Associate Professor in the School of Engineering, Macquarie University, Senior Lecture and a Lecturer in the Griffith School of Engineering, Griffith University, Australia for five years and as a Research Fellow in the School of Information Technology and Electrical Engineering, University of Queensland, Brisbane, Australia. He worked as lecturer and assistant professor for more than six years at RUET. He has supervised more than 25 HDR students and several M.Tech students. He has published more than 240 articles including 100 research

papers in peer reviewed journals of high reputes, one research contributed book, 3 edited books, 5 book chapters in reputed edited books and more than 120 conference papers. His current research citation is 5250 with H- Index 39. He has received total research grant more than \$5 M. He is a senior member of IEEE and editor of two reputed journals. His research interests include renewable energy integration and stabilization, voltage stability, micro grids and smart grids, robust control, electric vehicles, building energy management systems, and energy storage systems. Further details about Prof. Hossain can be seen at his homepage: <https://www.uts.edu.au/staff/jahangir.hossain>.



**Tariqul Islam** (M'16-SM'18) received the Ph.D. degree from Jadavpur University, Kolkata, India, in 2007. He is Professor in the Electrical Engineering Department, Jamia Millia Islamia (Central University), New Delhi with over 20 years of experiences in Academic and Research.

The sensing technology includes capacitive sensors, conductive sensors, impedance sensors, sensors array for electronic nose, SAW sensor for various applications such as health monitoring of transformer, gas insulated switch gears (GIS), moisture measurement for electronic gases, automatic dispensing system, measurement of pressure, temperature, density, liquid level, and the quality assessment of liquid drinks. He has supervised more than 16 Ph.D students and more than 28 M Tech students. Prof Islam has published more than 80 research papers in peer reviewed journals of high reputes (40 papers in IEEE Trans.), 85 papers in conferences, 4 edited books, 10 edited book chapters and filed four patents. His current research citation is 1600 with H-Index 22. He has received research grant from DST, DAE, CPRI, MHRD DRDO. He is a senior member of IEEE, life member of ISTE, IETE, and ICTP. He is a Topical editor of IEEE Sensors journal, an Associate Editor of IEEE Transactions on Instrumentation and Measurement. He received best AE awards from IEEE Sensors council (2017, 2018) and IEEE Trans. on Instrum. And Meas. (2020). Further details about T. Islam can be seen at <https://jmi.ac.in/electrical>.

## Course Venue:

COMMITTEE ROOM,  
Department of Electrical Engineering  
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## Course Joining link :

<https://jamiamilliaislamia.webex.com/jamiamilliaislamia/j.php?MTID=mf51e7119a6b12b3d7da56217fd91fb9b>