◆IEEE CCECE 2016 – TUTORIAL 1

SUNDAY, MAY 15TH, 2016 09:30-12:30 IN *SHAUGNESSY I*

GROUND FAULT PROTECTION, SYMMETRICAL COMPONENTS AND OTHER PRACTICAL PROTECTION CONCERNS

INSTRUCTOR: RASHEEK RIFAAT (JACOBS CANADA, CALGARY, AB, CANADA)

09:30 – 11:00 :	Tutorial in session
11:00 – 11:30 :	Coffee Break
11:30 – 12:30 :	Tutorial in session

SUMMARY:

The majority of distribution system faults start as line-ground (L-G) faults. Accordingly, attention has been given to grounding or isolation of neutral points of sources and transformers and L-G fault protection. Understanding L-G faults is indispensable for achieving the correct balance between different protection aspects such as coordination, selectivity, speed and economics. Continuity of power supply is critical for many industrial systems, meanwhile, quick fault identification and quick protection tripping reduces the risk of fault advancement into multiple phase faults with damaging currents, arc flash energies and associated hazards. Several computer programs provide great tools for short circuit calculations and relay coordination. However, it is important for electrical engineers and system designers to augment the use of computer programs with comprehensive understanding of their systems. One of the brilliant calculation methods, introduced in 1917 and still being used, is the symmetrical components method. In addition to the introduction of symmetrical components, this tutorial includes discussion on system neutral grounding, medium and low voltage cable and system capacitances, high and low resistance grounding and protection for L-G faults. Relevant IEEE Standards for Recommended Practices in Industrial and Commercial Power Systems (Series 3000) will be identified and discussed.

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SUNDAY, MAY 15TH, 2016 09:30-12:30 IN *PINNACLE III*

RADIATION EFFECTS IN AEROSPACE: ENVIRONMENT, EFFECTS, MODELING, DESIGN AND TESTING

INSTRUCTORS: DAVID HIEMSTRA (MDA)

LI CHEN (UNIVERSITY OF SASKATCHEWAN)

EWART BLACKMORE (TRIUMF)

MANOJ SACHDEV (UNIVERSITY OF WATERLOO)

09:30 – 11:00 :	Tutorial in session
11:00 – 11:30 :	Coffee Break
11:30 – 12:30 :	Tutorial in session

SUMMARY:

The tutorial targets researchers who are interested in gaining knowledge in radiation effects for space applications. For graduate students, this will be an opportunity for them to pick up general information about radiation effects in silicon devices. For senior researchers, this tutorial will provide a platform and forum for future collaborations, such as collaborative research projects with space companies, collaboration projects on space exploration missions, etc.

The tutorial will include the following items:

1. Overview of the space and terrestrial radiation environment
2. Describe the basic radiation effects observed in semiconductor devices
3. Provide examples of radiation effects on complex microcircuits
4. Describe modeling techniques for single event effects
5. Describe examples and results of radiation hardened by design techniques
6. Review of radiation effects test techniques
7. An overview of Canadian facilities available for radiation effects testing

SUNDAY, MAY 15TH, 2016 09:30-12:30 IN *SHAUGNESSY II*

WIRELESS COMMUNICATIONS WITH ENERGY HARVESTING NODES

INSTRUCTORS: MD. JAHANGIR HOSSAIN (UBC – OKANAGAN)

IMTIAZ AHMED (MCGILL UNIVERSITY)

09:30 – 11:00 :	Tutorial in session
11:00 – 11:30 :	Coffee Break
11:30 – 12:30 :	Tutorial in session

SUMMARY:

The outline of the tutorial is as follows:

- Fundamental limits of communications under EH constraints
- Information theoretic aspects of EH wireless communications
- EH models and practical considerations towards designing EH nodes
- Performance analysis of systems energized by renewable energies
- Radio resource allocation and scheduling in EH networks
- Simultaneous wireless information and power transfer
- Energy cooperation and relaying in wireless networks
- Multi-antenna technologies for EH systems
- Multi-user systems for EH wireless communications
- Routing and MAC protocols under EH constraints
- Cognitive radio design with EH systems
- Detection, estimation, computation, compression, machine learning, and signal processing for EH systems

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SUNDAY, MAY 15TH, 2016 13:30-16:30 IN *PINNACLE III*

SOCIAL LEARNING AND CONTROLLED SENSING

INSTRUCTOR: VIKRAM KRISHNAMURTHY (UNIVERSITY OF BRITISH COLUMBIA)

13:30 – 15:00 :	Tutorial in session
15:00 – 15:30 :	Coffee Break
15:30 – 16:30 :	Tutorial in session

SUMMARY:

This tutorial describes the fundamentals of social learning and controlled sensing for adaptive decision making. Such tools are essential in the formulation of mathematical models and design of adaptive radars, reconfigurable sensors and social sensing. The tutorial is in three parts. The first part describes several examples. The second part gives a brief introduction to Bayesian estimation and filtering. The final part briefly outlines how stochastic control (partially observed Markov decision processes) can be used to design smart sensing systems. The tutorial focuses primarily on conceptual formulation and algorithms – it does focus on technology.