



## ELECTRICAL ENGINEERING

# ELECTROMAGNETIC COMPATIBILITY, EMC

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**TYPE OF COURSE** : New | Elective | UG / PG

**INTENDED AUDIENCE** : ME/MS/MSc

**COURSE DURATION** : 8 weeks (25 Feb'19 - 19 Apr'19)

**EXAM DATE** : 28 Apr 2019

**PRE-REQUISITES** : Basic circuit analysis, basic electromagnetic field theory

**INDUSTRIES APPLICABLE TO** : ABB, Ericsson, Siemens, Nokia, Bombardier, Alstom, Volvo, SAAB, Lockheed Martin, Boeing etc.

### COURSE OUTLINE :

All systems that generate or consume electrical energy can produce electromagnetic noise that may interfere with the operation of the system itself and/or other systems. Electromagnetic interference (EMI) is a potential threat to the present day electronic devices. The course shows the students how the principles of electricity and magnetism can be applied to design electrical and electronic systems that can co-exist harmoniously, that is, to design systems that are electromagnetically compatible with each other. The students will learn how electromagnetic disturbances are generated in systems, how they couple to other systems, and how systems can be protected.

### ABOUT INSTRUCTOR :

Daniel Månsson is Associate Professor in Smart grid power system components at KTH Royal Institute of Technology, Sweden. His PhD is in EMC and Intentional Electromagnetic Interference (IEMI) and has contributed to research connected to IEMI and EMC in large distributed systems and effects as well as international standards and consulting projects for private companies and government bodies.

Rajeev Thottappillil is Professor at the School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology, Stockholm, Sweden. His research contributions are mostly in electromagnetics of lightning, effects of lightning on electrified railways, and mitigation of intentional electromagnetic interference. He is a Fellow of IEEE.

### COURSE PLAN :

**Week 01** : Introduction to EMC - Relevant concepts from electromagnetic field theory

**Week 02** : Non-ideal or high-frequency behavior of components

**Week 03** : Crosstalk or near-field coupling

**Week 04** : EM topology & grounding

**Week 05** : EM Shielding

**Week 06** : Surge protection and filters

**Week 07** : Problem of Intentional electromagnetic interference, Lightning protection

**Week 08** : EMC measurements and Standards