Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NECD521	Electromagnetic Interference & Compatibility	3	0	0	3

Course Objective

This course is designed to familiarize the students with different concepts related to EMI and EMC. At the end of the course the students will have the knowledge required to design an electromagnetically compatible system.

Learning Outcomes

At the end of the course the student able to learn the concepts of

- Real-world EMC design
- Designing electronic systems that function without errors or problems related to electromagnetic compatibility
- Diagnose and solve basic electromagnetics

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction of EMI & EMC, Aspects of EMC, Common EMC units, CISPR & FCC limits, measurement of conducted and radiated emission, Antenna factor, Additional product requirements, Design Constraints for products, Advantages of EMC design, Spectra of digital waveforms, Time domain analysis of transmission lines,	06	Students will be familiarized with the basics concepts of EMI and mandatory requirements to be fulfilled by a system to be EMC.
2	High speed digital interconnects and signal integrity, Lumped circuit approximate models, Non-ideal behavior of components (wires, PCB boards, leads, resistors, capacitors, inductors) , ferromagnetic materials and ferrite beads, common-mode chokes, Electromechanical devices, Digital circuit devices, Effect of component variability, Mechanical switches.	05	Students will understand the non-ideal behaviour of components and able to design digital clocks for a high speed system.
3	Power supply filters, conducted susceptibility, Simple emission models for wires and PCB lands, Simple susceptibility model for wires and PCB lands, Three conductor transmission lines and crosstalk, Electrostatic discharge	9	Students will be familiarized with the four basic methods of EMI – radiated emission, conducted emission, crosstalk, and ESD.
4	The transmission-line equations for lossless lines, The per-unit-length parameters, The inductive-capacitive coupling approximate model, Lumped-circuit approximate model, Shielded wires, Twisted wires.	8	Students will understand how to design a system to reduce EMI via these processes.
5	Shielding effectiveness for far field and near field sources, Low frequency magnetic field shielding, Effect of apertures,	8	Students will understand how to design a shield for a RF system and place differentcomponents of the system in a PCB.
6	Different ground systems, System configuration and design.	6	Design of RF system on PCB
	Total	**42**	

Text Book:

1. Clayton R. Paul, 'Introduction to Electromagnetic Compatibility', Wiley – India, 2nd edition, 2010.

Reference Books:

1. Engineering Electromagnetic Compatibility: Principles, Measurements, and Technologies, by V. Prasad Kodali, Wiley-IEEE Press Home, 2nd edition, 2001
2. Electromagnetic Compatibility Engineering by Henry W. Ott, 1st edition, 2009.
3. Electromagnetic Compatibility of Integrated Circuits: Techniques for low emission and susceptibility, by Sonia Ben Dhia, Mohamed Ramdani, Etienne Sicard, 1st Edition, 2006.