

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B.Tech. in Electrical Engineering
Semester:	VII
Course Code:	2EEDE14
Course Title:	Electromagnetic Interference and Electromagnetic Compatibility
Course Type:	(<input type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input checked="" type="checkbox"/> Department Elective / <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ <input type="checkbox"/> Open Elective/ <input type="checkbox"/> Any other)
Year of Introduction:	2021 – 22

Credit Scheme

L	T	Practical component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

At the end of the course, students will be able to-

1. identify EMI/EMC problems in electrical systems
2. analyze the effects of EMI on system performance
3. select appropriate technique to reduce the EMI effects on electrical systems
4. design of EM compatible electrical systems

Syllabus:

Total Teaching hours: 45

Unit	Syllabus	Teaching hours
Unit-I	EMI and EMC Concepts Terminology and definitions, sources and victim of EMI, conducted and radiated EMI emission and susceptibility, transient EMI, electrostatic discharge (ESD).	08
Unit-II	EMI Coupling Principles Conducted, radiated and transient coupling, common ground impedance coupling, common mode and ground loop coupling, differential mode coupling, field to cable coupling, power mains and power supply coupling.	10
Unit-III	EMI in Analog Circuit EMI issues in power circuits, conducted noise emission from SMPS, conducted noise emission standards, EMI issues in PWM techniques, ground loops problem in power converters, radiated emission issues in power converters, power distribution issues in PCB using different converters, conducted noise emission standards.	15
Unit-IV	Control Techniques for EMC Conducted noise emission calculation in frequency domain using graphical methods, use of line filters, characteristics of filters, impedance and lumped element filters, design of line filters, shielding, grounding, transient suppressors, case study on EMI Control, relevant EMC standards.	12

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings/ References:

1. Clayton R.Paul - Introduction to Electromagnetic Compatibility, John Wiley Publications
2. H. W. Ott - Noise reduction techniques in electronic systems, John Wiley & Sons Publications
3. V. P. Kodali - Engineering EMC Principles, Measurements and Technologies, IEEE Press, NY
4. E. L. Bronaugh, and W. L. Lambdin - Electromagnetic interference test methodology and procedures, Interference Control Technologies Inc.
5. International standards like CISPR 14-1:2020, IEC 61000-6-4, IEC 61000-3-7:2008

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. academic year 2021-22 and onwards