

COURSE CODE: 1153EE109	COURSE TITLE: EMI & EMC TECHNIQUES	L	T	P	C
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COURSE CATEGORY:

Allied Elective

PREAMBLE :

To make the student understand Power quality in power systems

COURSE EDUCATIONAL OBJECTIVES:

The objectives of the course are to make the students,

- To acquire knowledge of non linear loads.
- To acquire knowledge of different converter circuits used in power systems
- To walk around the various applications and stability analysis in power systems.

COURSE OUTCOMES :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Understand the basic idea behind EMI and EMC	K2
CO2	Gain knowledge about grounding techniques.	K2
CO3	Gain knowledge on the importance of shielding.	K2
CO4	Understand the concepts of digital circuit noise.	K2
CO5	Gain knowledge on industrial and government standards for EMI	K2

CORRELATION OF COs AND POs

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L		L					L			
CO2	L								L		L	
CO3	H	H				M	M			H	L	
CO4	H		M									
CO5	H	H		H					H			

COURSE CONTENT:

UNIT I	INTRODUCTION	9
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Sources of EMI, Conducted and radiated interference- Characteristics - Designing for electromagnetic compatibility (EMC)- EMC regulation- typical noise path- use of network theory- methods of eliminating interferences

UNIT II	METHOD OF HARDENING	9
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Cabling –capacitive coupling- inductive coupling- shielding to prevent magnetic radiation-shield transfer impedance, Grounding – safety grounds – signal grounds- single point and multipoint ground systems- hybrid grounds- functional ground layout –grounding of cable shields- ground loops-guard shields.

UNIT III	BALANCING, FILTERING AND SHIELDING	9
Power supply decoupling- decoupling filters-amplifier filtering –high frequency filtering shielding – near and far fields- shielding effectiveness- absorption and reflection loss, Shielding with magnetic material- conductive gaskets, windows and coatings- grounding of shields.		
UNIT IV	DIGITAL CIRCUIT NOISE AND LAYOUT	9
Frequency versus time domain- analog versus digital circuits- digital logic noise- internal noise sources- digital circuit ground noise –power distribution-noise voltage objectives- measuring noise voltages-unused inputs-logic families.		
UNIT V	ELECTROSTATIC DISCHARGE, STANDARDS AND LABORATORY TECHNIQUES	9
Static Generation- human body model- static discharges-ED protection in equipment design- ESD versus EMC, Industrial and Government standards – FCC requirements – CISPR recommendations-Laboratory techniques- Measurement methods for field strength-EMI.		
TOTAL: 45 PERIODS		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. Henry W.Ott, “ Noise reduction techniques in electronic systems”, John Wiley & Sons, 1989. 2. Bernhard Keiser, “Principles of Electro-magnetic Compatibility”, Artech House, Inc. (685 canton street, Norwood, MA 020062 USA) 1987. 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Bridges, J.E Milleta J. and Ricketts.L.W., “EMP Radiation and Protective techniques”, John Wiley and sons, USA 1976. 2. IEEE National Symposium on “Electromagnetic Compatibility”, IEEE, 445, hoes Lane, Piscataway, NJ 08855. 		