# III B.Tech – II Semester (17EC632) EMI/EMC (Dept. Elective-II)

Int. Marks Ext. Marks Total Marks

40	60	100
ΨU	00	100

## Pre-Requisites: None

## **Course Objectives:**

- Student shall be able to understand the root causes for Electromagnetic Noise (EMI), its sources.
- Shall be able to understand the effects of EMI and the required precautions to be taken/to be discussed with his peer group.
- Shall be able to understand the different measurement techniques of EMI (for conducted and normal) and their influences in detail.
- Shall be able to understand different compatibility techniques (EMC) to reduce/suppressEMI.
- Shall be able to understand different standards being followed across the world in the fields of EMI/EMC.

# UNIT-I: Natural and Nuclear sources of EMI / EMC:

Introduction, Electromagnetic environment, History, Concepts, Practical experiences and concerns, frequency spectrum conservations. An overview of EMI / EMC, Natural and Nuclear sources of EMI.

## UNIT-II: EMI from apparatus, circuits and open area test sites:

Electromagnetic emissions, noise from relays and switches, non-linearities in circuits, passive inter modulation, cross talk in transmission lines, transients in power supply lines, electromagnetic interference (EMI). Open area test sites and measurements.

#### UNIT-III: Radiated and conducted interference measurements:

Anechoic chamber, TEM cell, GH TEM Cell, characterization of conduction currents / voltages, conducted EM noise on power lines, conducted EMI from equipment, Immunity to conducted EMI detectors and measurements.

# UNIT-IV:ESD, Grounding, shielding, bonding and EMI filters :

Principles and types of grounding, shielding and bonding, characterization of filters, power lines filter design. ESD, Electrical fast transients / bursts, electrical surges.

#### **UNIT-V: Cables, connectors, components**:

Introduction, EMI suppression cables, EMC connectors, EMC gaskets, Isolation transformers, optoisolators, Transient and Surge Suppression Devices.

# UNIT-VI: EMC standards- National / International

Introduction, Standards for EMI and EMC, MIL-Standards, IEEE/ANSI standards, CISPR/IEC standards, FCC regulations, Euro norms, British Standards, EMI/EMC standards in JAPAN, Conclusions.

L T P C 3 1 - 3

# **Course Outcomes:**

After successful completion of the course, the students can be able to:

S. No	Course Outcome			
1.	Distinguish effects of EMI and counter measures by EMC-techniques.			
2.	Apply the knowledge gained in selecting proper gadget/device/appliance/system, as per			
	EMC- norms specified by regulating authorities.			
3.	Choose career in the fields of EMI/EMC as an Engineer/Researcher/Entrepreneur in	L3		
	India/abroad.			
4.	Distinguish effects of EMI and counter measures by EMC-techniques.	L4		

# **Correlation of COs with POs & PSOs:**

СО	PO	PO2	PO3	PO4	<b>PO5</b>	PO6	<b>PO7</b>	<b>PO8</b>	PO9	<b>PO10</b>	<b>PO1</b>	<b>PO12</b>	PSO1	PSO2
	1										1			
CO 1	3	2	1	-	-	-	-	-	1	1	1	1	3	2
CO 2	2	2	3	-	-	-	-	-	1	1	1	1	2	2
CO 3	2	2	2	-	-	-	-	-	1	1	1	1	2	2
<b>CO 4</b>	3	2	2	-	-	-	-	-	1	1	1	1	3	2

## **Text Books:**

- 1. Digital communications Simon Haykin, John Wiley, 2005
- 2. Principles of Communication Systems H. Taub and D. Schilling, TMH, 2003

## **Reference Books:**

- 1. Digital and Analog Communication Systems Sam Shanmugam, John Wiley, 2005.
- 2. Digital Communications John Proakis, TMH, 1983. Communication Systems Analog & Digital Singh & Sapre, TMH, 2004.
- 3. Modern Analog and Digital Communication B.P.Lathi, Oxford reprint, 3rd edition, 2004