PVP 22

EMI/EMC

22ECMC1T6A **Credits: 4**
Lecture: 4 periods/week **Internal assessment: 40 marks**
Semester end examination: 60 marks

Prerequisites: Basic knowledge of electronic components, circuits, electromagnetic fields and systems.

Course Outcomes:

At the end of the course Student will be able to

1. Understand EMI/EMC standards, different sources of EMI/EMC, different mitigation techniques and testing of interference (L2)
2. Analyze, measure and evaluate radiated and conducted emissions to examine the electromagnetic compatibility (L4)
3. Evaluate the impact of EMI mitigation techniques (L3)
4. Analyze different test setups for measuring radiation (L4)

UNIT - I

Introduction: Electromagnetic environment, History, Concepts, Practical experiences and concerns, frequency spectrum conservations, an overview of EMI / EMC.

EMC Standards: Standards for EMI/EMC, IEEE/ANSI Standards, CISPR/ IEC Standards, FCC Regulations.

UNIT – II

Natural and Nuclear Sources of EMI / EMC: Introduction, Celestial Electromagnetic Noise, Electrostatic Discharge, Electromagnetic Pulse.

EMI from Apparatus, Circuits: Electromagnetic emissions, Noise from relays and switches, Non-linearity in circuits, passive intermodulation, Cross talk in transmission lines, Transients in power supply lines, Electromagnetic interference.

Pulsed Interference Immunity: Pulsed EMI Immunity, Electrical fast transients / bursts, Electrical surges.

UNIT - III

Grounding, Shielding, Bonding: EMC Technology, Grounding, Shielding, Electrical bonding.

Cables, Connectors, and Components: EMI suppression cables, EMC connectors, EMC gaskets.

UNIT - IV

Open Area Test Sites: Open-Area Test Site Measurements, Measurement Precautions.

Radiated Interference Measurements: Anechoic chamber, TEM cell, Reverberating Chamber, Giga-Hertz TEM Cell

Conducted Interference Measurements: Characterization of conduction currents / voltages, Conducted EM noise on power supply lines, Conducted EMI from equipment, Immunity to conducted EMI, detectors and measurements

TEXT BOOKS:

1. Dr. V.P. Kodali, IEEE Publication, "Engineering Electromagnetic Compatibility", Printed in India by S. Chand & Co. Ltd., New Delhi, 2000
2. IIT – Delhi, "Electromagnetic Interference and Compatibility IMPACT series", Modules 1 – 9

REFERENCE BOOKS:

1. C.R. Paul., "Introduction to Electromagnetic Compatibility", Ny John Wiley, 1992