

EC8072 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

DETAILED SYLLABUS

OBJECTIVES:

- To introduce the basic concepts of Electromagnetic Interference
- To teach the importance of Electromagnetic Compatible designs
- To explain the existing standards for Electromagnetic Compatibility

UNIT I EMI/EMC CONCEPTS

EMI-EMC definitions; Sources and Victims of EMI; Conducted and Radiated EMI Emission and Susceptibility; Case Histories; Radiation Hazards to humans.

UNIT II EMI COUPLING PRINCIPLES

Conducted, radiated and transient coupling; Common ground impedance coupling; Common mode and ground loop coupling; Differential mode coupling; Near field cable to cable coupling; Field to cable coupling; Power mains and Power supply coupling; Transient EMI, ESD.

UNIT III EMI CONTROL

Shielding; EMI Filters; Grounding; Bonding; Isolation transformer; Transient suppressors; EMI Suppression Cables.

UNIT IV EMC DESIGN FOR CIRCUITS AND PCBs

Noise from Relays and Switches; Nonlinearities in Circuits; Cross talk in transmission line and cross talk control; Component selection and mounting; PCB trace impedance; Routing; Power distribution decoupling; Zoning; Grounding; VIAs; Terminations.

UNIT V EMI MEASUREMENTS AND STANDARDS

Open area test site; TEM cell; EMI test shielded chamber and shielded ferrite lined anechoic chamber; Line impedance stabilization networks; EMI Rx and spectrum analyzer; Civilian standards - CISPR, FCC, IEC, EN; Military standards-MIL461E/462.

TEXT BOOKS:

1. V.P. Kodali, —Engineering EMC Principles, Measurements and TechnologiesII, IEEE Press, Newyork, 1996. (Unit I – V)
2. Henry W. Ott., Noise Reduction Techniques in Electronic SystemsII, A Wiley Inter Science Publications, John Wiley and Sons, Newyork, 1988. (Unit – IV)

REFERENCES:

1. C.R. Paul, IIIntroduction to Electromagnetic CompatibilityII, John Wiley and Sons, Inc, 1992.
2. Bernhard Keiser, —Principles of Electromagnetic CompatibilityII, 3rd Ed, Artech house, Norwood, 1986.
3. Don R. J. White Consultant Incorporate, —Handbook of EMI/EMCII, Vol I-V, 1988.