

EEL 4478 Electromagnetic Compatibility

Credits:3

Text book, title, author, and year Introduction to Electromagnetic Compatibility (Second Edition) 2006, by Clayton Paul
Supplemental materials Notes

Specific course information

- Course descriptions: Introduction to electromagnetic compatibility (EMC), intersystem and intrasystem interferences and their characteristics, coupling by conduction and radiation, shielding, and interference reduction techniques.
- Prerequisites EEL 3470 Electromagnetic Fields and Waves; EEE 4361 Electronics 2
- Required, elective, or selected elective Elective

Specific goals for the course

Specific outcomes of instruction:

The students will learn several basic mechanisms of electromagnetic interference generated either by man-made or natural type, in the frequency range from low megahertz to about 10 gigahertz. The students will be able to calculate the emissions based on the antenna characteristics and system gain. The student will be able to understand several simple EMI mitigating techniques.

The students will utilize the information received from the class to team design/fabricate a PCB for minimum EMI emissions, to perform an EMI measurement, and to compare the results against FCC requirements. The student will be a better circuit designer for high speed electronics devices to reduce EMI emissions.

The student will be able to effectively communicate in writing answers to qualitative questions on tests.

Brief list of topics to be covered

Introduction to EMC and its sources
Common FCC and EU standards relating to EMI
Spectra of Digital Waveform, LISN
Transmission line characteristics, mismatch, signal integrity
Non-ideal behavior of R, L and C, ferrite, common mode chokes
Introduction to Dipole, Loop, Biconical, and Log periodic Antennas
Common mode noise and radiated emissions
Grounding concepts
Printed circuit board design to reduce EMI
Electrostatic Discharge, ESD
Shielding material and technique
Design and fabricate PCB, EMI measurement techniques