Electrical Engineering 5600: Interference Control in Electronic Systems
Prior Number – Electrical Engineering 371

Credit and Contact Hours
3 credit hours lab (Three 50-minute or two 75-minute lectures per week are typical).

Instructor
Varies; Daryl Beetner, Ph.D.; Jun Fan, Ph. D.

Text(s)

Course Information
Course Description
Principles of high frequency effects in PCBs and components, generation of unwanted radio-frequency (RF) signals by ICs, RF radiation mechanisms, shielding, and immunity against electrostatic discharge and RF signals.

Prerequisites
Electrical Engineering 217 and Electrical Engineering 271.

Required or Elective
Selected Elective

Course Goals
General Outcomes
1. Diagnose and solve basic electromagnetic compatibility problems.
2. Design electronic systems that function without errors or problems related to electromagnetic compatibility.
3. Understand real-world EMC design constraints and make appropriate trade-offs to achieve the most cost-effective design that meets all requirements.
4. Effectively describe EMC-related concepts and ideas to circuit and system designers.
Relationship of Course to Program Outcomes

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S – strong connection; M – medium connection; W – weak connection

Topics Covered

1. EMC Definitions, History, EMC Regulations (1 week)
2. Gauss’s and Faraday’s Laws, Capacitance, Resistance (1 week)
3. Ampere’s Law, Inductance, Crosstalk (1 week)
4. Electromagnetic Radiation, Circuits as Antennas (1 week)
5. CM and DM Currents, Cables and Slots as Antennas (1 week)
6. Practical EMI Shielding (1 week)
7. Frequency-Domain Representation of Time-Domain Signals (1 week)
8. Parasitics, High-Frequency Component Modeling (1 week)
9. Digital Logic, Printed Circuit Boards as EMI Sources (1 week)
10. Susceptibility Issues with Printed Circuit Boards (1 week)
11. Power Bus Decoupling, PCB Design and Layout (1 week)
12. Circuit and System Ground (1 week)
13. Conducted EMI Sources, EMC Filter Design (1 week)
14. Electrostatic Discharge, Lightning, Transient Protection (1 week)
15. Exams (1 week)