The University of Akron
Department of Electrical Engineering

4400:451-001 Electromagnetic Compatibility — Dr. N. Ida
Spring 2018 — Schrank South 108 — Room ASECS-252
Time 1:10 - 2:00 pm — TEL: 330-972-6525
MWF — e-mail: ida@uakron.edu

TEXT: Optional text: C.R. Paul, Introduction to Electromagnetic Compatibility, Wiley. Notes will be distributed as necessary.

Office Hours: To be decided by mutual agreement. Suggested times: Monday and Friday, 8:00 to 9:45 AM and Wednesday 3:00-5:00 PM.

Course Outline:
1. Introduction to EMC, EMI, EMS: What is EMC/EMI, why is it important, History
2. EMC requirements: the regulatory aspect of EMC
3. Government requirements
4. Product requirements
5. Industry's requirements
5. Basic conduction methods (transmission lines)
6. Basic radiation systems (antennas, propagation, reception)
7. Signals and power spectra and their relation to EMC
8. Radiated emission and susceptibility
9. Conducted emission and susceptibility
10. Crosstalk
11. Shielding
12. Electrostatic discharge (ESD) and protection
13. Lightning and lightning protection
14. System design for EMC
15. EMC measurements

Grading: 60% homework, 40% exams.

1st Exam	20%	(Tentative: Friday, February 16)
2nd Exam	20%	(Firm: Friday, March 23)
Homework/presentations	60%	(see below)

There will be no final exam in this course. Exams will be approximately 50 minutes long.

This class is different than most others you have taken in that we take more of a system approach to emc. Thus, there will be less emphasis on exercises and more on general requirements and practices. Because of this, homework assigned will consist of a few assignments on a particular topic. You will be assigned a subject, given approximately two weeks to research it, write a report and present it to the class. There will be 3-4 assignments during the Semester. Your grade will be based on these reports and your presentation. The reports you write will be distributed to the class for future reference. You will be working in groups and will write a single report per group but

with clear and marked contributions of each member of the team. Each member of the group must participate in the presentation and will be graded individually on his/her contribution to the report and the presentation. Ideal number of people in a group is 3. In no case will there be more than 4 people in a group. You will be asked to form your own groups for this purpose.

The reason for this approach is the subject itself. EMC is an elusive subject and, more often than not, is a blend of art and science. Because of this, your conclusions on a particular subject (in class or in the workplace) will almost never going to be clear-cut. Thus the need to present, reason, and defend your findings and opinions.

The first assignment will deal with regulatory issues. The second will deal with specific applications and practices in EMC. The third will deal with emc methods (tests, mitigation, etc.). I will insist that your work and reports be complete, well documented and original work. I want to read and hear your words not those of an internet article. I will ask questions and you need to understand what you wrote in your report.

A word of warning: Because EMC is often poorly understood, you will find, in the course of your searches, many references to nonscientific issues. Be careful, especially when using material off the web. Sometimes you will have to sift through material and discard outrageous claims (you will meet UFO type of claims, world domination type, conspiracy claims, plain nonsense, and many others). Remember that although EMC is a complicated issue, it is purely physical and very real. Beliefs, paranormal experiences and unsubstantiated claims are not part of the science.