



**FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE**
Proposal for a New Course

DO NOT TYPE IN THIS BOX

Bulletin # : _____

Academic Year : _____

1. School/College Engineering and Computing
Div./Dept. in Which Taught Electrical and Computer Engineering

2. EEL 6 C 3
Alpha 1st Last 3 "C"-lec-lab Cr. Hrs.
Prefix Digit Digits "L"-Lab

CIP Code (Leave this blank): _____

3. Grading Method (select one): Graded Pass/Fail

4a. Course Title Electromagnetic Interference and Electromagnetic Compatibility

b. Abbreviated course Title (for computer class schedules, transcripts) EMI EMC

LIMITED TO 25 Characters (including spaces)

5. Statewide Course Numbering Subject Matter Area _____

6. Catalog Description/Major Topics (not to exceed 200 characters including spaces)
College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

The goal of this course is to teach concepts of electromagnetic compatibility and electromagnetic interference to the graduate students.

7. Attach detailed syllabus course outline and course justification on separate page(s).

8. Prerequisite(s): EEL 3135 Signals and System and EEL 4410 Fields and Waves

9. Corequisite(s): _____

10. Objective(s) of Course: _____

1. Learn the mechanisms of interference of one electronic device onto next electronic devices
2. Methods to characterize such interference by means of mathematical and experimental tools.

11. Does this course duplicate/overlap other courses at FIU? No Yes
If yes, please explain: _____

12. What other closely related department(s) have been consulted about this course? _____

13. Is this course used for the assessment of a program or a certificate (if yes, then send a notification to assessment@fiu.edu)? No Yes

PROPOSAL REQUESTED BY:

Faculty Contact <u>Shubhendu Bhardwaj</u>		10 / 17 / 20 19
(Type name)	(Signature)	
<u>sbhardwa@fiu.edu</u>	540-624-9098	
(Email address)	(Phone number)	
Chairperson (Dept./Div.) <u>Shekhar Bhansali</u>		10 / 17 / 20 19
(Type name)	(Signature)	
Chairperson (Curr. Comm.) _____	_____	/ / 20
(Type name)	(Signature)	
College/School Dean _____	_____	/ / 20
(Type name)	(Signature)	

Submit one original form. Attach one copy of the course justification and course syllabus, course description, objectives, major topics and textbooks.

**EEL 6990 Electromagnetic Compatibility and Electromagnetic Interference
Fall 2019, 3-Credits**

Course Justification

Effect of environment is a crucial part of electronic and electrical system design. This includes understanding of effect nearby systems on a system under consideration as well as effect of the signal radiated by a system. Finally, the course covers the methods of designing a system such that above issues are accounted for. These are crucial to training electrical engineering to the new graduate students and is a requirement for many jobs in the market. Currently there are no courses on EMI/EMC topics in the graduate curriculum.

EEL 6990C Electromagnetic Interference and Electromagnetic Compatibility

3-Credits

Department of Electrical & Computer Engineering

Florida International University

Fall-2019

<https://policies.fiu.edu/policy/736>

Classroom	: EC 1113
Class Time	: Tu/Th 12:30PM - 1:45PM
Faculty	: Shubhendu Bhardwaj
Office Hours	: We/Fr 2:00 PM – 3:00 PM
Office	: EC 3910
Phone	: 305-348-5444
Email	: sbhardwa@fiu.edu
Prerequisite	: EEL 3135 Signals and System : EEL 4410 Fields and Waves
Textbook	: Electromagnetic Compatibility Engineering : Author: Henry W. Ott

Course Description

The goal of the course is to teach the effect of electromagnetic radiation and interference on electronic and electrical systems. The course will start with introduction to electrical and electronic systems, classifications of class A and Class B type devices and FCC regulations, theory and applications of conducted emissions and radiated emissions in systems, network analysis and directional couplers, cabling, shielding, electrostatic discharge and interference in PCB board type circuits.

Course Objectives

Be able to

1. Learn the mechanisms of interference of one electronic device onto next electronic devices
2. Learn methods to characterize such interference by means of mathematical and experimental tools.
3. Learn methods to reduce and eliminate electromagnetic interference.

Topics Covered

1. Introduction to EMI/EMC regulations
2. Noise coupling mechanism
3. Capacitive coupling between conductors and their shielding
4. Inductive coupling between conductors and their shielding

5. Balancing and filtering
6. CMRR in differential amplifiers
7. Ferrites
8. Shielding
9. Intrinsic noise sources and active device noise.

Relationship of course to program objectives

In this course, the student will have to show:

1. an ability to apply knowledge of mathematics, science, and engineering,
2. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
3. an ability to identify, formulate, and solve engineering problems (homework),
4. an understanding of professional and ethical responsibility
5. an ability to communicate effectively
6. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
7. an ability to communicate effectively (through teamwork),
8. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice,
9. a knowledge of contemporary issues.
10. an ability to apply probability and statistics, including applications to electrical/computer engineering program.

Grading Scheme

Midterms (I and II)	30%
Finals	40%
Homeworks	30%
Total	100%

Tentative Grading Scale (100-58)/7 = 6 pts. / letter grade)

A	94-100	B+	82-87.9	C+	64 - 69.9
A-	88-93.9	B	76-81.9	C	58 - 63.9
		B-	70-75.9		

Tentative Dates:

- 10/15/2019
- 11/28/2019

University's Code of Academic Integrity

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are

expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational Mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

More information can be found at http://academic.fiu.edu/academic_misconduct.html

Department Regulations Concerning Incomplete Grades

To qualify for an Incomplete, a student:

1. Must contact (e.g., phone, email, etc.) the instructor or secretary before or during missed portion of class.
2. Must be passing the course prior to that part of the course that is not completed
3. Must make up the incomplete work through the instructor of the course
4. Must see the Instructor. All missed work must be finished before last two weeks of the following term.

University policies on sexual harassment, and religious holidays, and information on services for students with disabilities

Please visit the following websites:

<http://academic.fiu.edu/>

<http://drc.fiu.edu>

Course Policies:

- **Academic Misconduct:** For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.
- **Unexcused Absences:** Two unexcused absences are permitted during the term. More than two will result in the loss of points from your final grade. (1 point per absence above two, 3 points per absence above 5).
- **Excused Absences:** Only emergency medical situations or extenuating circumstances are excused with proper documentation. After reviewing documentation you are required to email a description of the excuse and absence dates as a written record to kaleemf@fiu.edu.
- **On Time:** As in the workplace, on time arrival and preparation are required. Two "lates" are equivalent to one absence. (Leaving class early is counted the same as tardy.)
- **Deadlines:** Assignments are due at the beginning of the class period on the date specified. Assignments submitted late (within 1 week) will receive half credit.
- To get assistance try to see me by an appointment.
- Students are encouraged to ask questions and to discuss course topics with the instructor and with each other.
- **Any work submitted should display Panther ID number and should be signed, as the students' own work, and that no unauthorized help was obtained.**

- Cell phones, communicators, MP3 players, head sets are not allowed to be used in the class.
- **DO NOT** send assignments by email.
- Instructor reserves right to change course materials or dates as necessary.

Exam policy

1. Make sure to complete the assigned homework in order to do well in the exam.
2. All exams are closed book and closed notes.
3. Use of any electronic device with keyboard is prohibited. This also applies to cellphones with messaging system.
4. No discussion is permitted during the exams.
5. Instructor is not compelled to give credit for something he cannot read or follow logically.
6. Cheating is considered as a serious offense. Students who are caught will receive the appropriate consequences.

Class Schedule

Week	Date	Topic	Assignment
Week-1			
Week-2			
Week-3			
Week-4			
Week-5			
Week-6			
Week-7			
Week-8			
Week-9			
Week-10			
Week-11			
Week-12			
Week-13			
Week-14			

Week-15			
Week-16			