# EE 4301.501.19S Course Syllabus

**Course Information**

| | |
|---|---|
| *Course Number/Section* | EE 4301.501.19S |
| *Course Title* | Electromagnetic Engineering I |
| *Term* | Spring 2019 |
| *Days & Times* | Tuesday and Thursday: 5:30pm-6:45pm |
| *Meeting Place* | ECSW 3.210 |

**Professor Contact Information**



| | |
|---|---|
| *Professor* | James M. Florence, Ph.D. |
| *Office Phone* | 972-883-4968 |
| *Email Address* | James.Florence@utdallas.edu |
| *Office Location* | ECSN 4.320 |
| *Office Hours* | Mondays through Thursday 12:30pm to 2:00pm |



**Course Pre-requisites, Co-requisites, and/or Other Restrictions:**

Prerequisites: PHYS 2326 and ENGR 3300 and (CE 3301 or EE 3301 or TE 3301).

**Course Description:**

Introduction to static electric and magnetic fields. Introduction to the general characteristics of wave propagation. Physical interpretation of Maxwell's equations. Propagation of plane electromagnetic waves and energy.

**Course Learning Objectives:**

1. Ability to explain and analyze electro-static and magneto-static fields.
2. Ability to determine electric and magnetic fields in the presence of simple dielectric, magnetic and conducting materials.
3. Ability to explain the physical significance of Maxwell's equations and the coupling of electric and magnetic fields.
4. Ability to explain electromagnetic wave equations and the propagation of electromagnetic fields and energy.

**Required Textbooks and Materials:**

*Required Texts*

**Electromagnetics** by Arlon T. Adams and Jay Kyoon Lee, (Cognella, Inc. 2016), 2nd Edition IBSN: 978-1-5165-2065-7

*Recommended Material*

**div grad curl and all that**, by H.M. Schey, Third Edition (Norton, 1997) IBSN: 0-393-96997-5

**A Student's Guide to Maxwell's Equations**, by Daniel Fleisch, (Cambridge University Press, 2008) IBSN: 978-0-521-70147-1

**Detailed Course Content:**

1. Introduction
    a. Review of Vector Algebra
    b. Coordinate Systems
    c. Charges and Electric Fields
    d. Currents and Magnetic Fields
2. Static Fields
    a. Gradients, Laplacians and the Potential Functions
    b. Poisson's and Laplace's Equations
    c. Capacitance, Conductance, and Inductance
    d. Electric- and Magnetic-Field Systems
3. Maxwell's Equations in Integral Form
    a. Gauss's Laws
    b. Faraday's Law of Induction
    c. Ampere's Circuital Law
    d. Electro- and Magneto-statics
4. Maxwell's Equations in Differential Form
    a. Gauss's Laws
    b. Faraday's and Ampere's Laws
    c. The Wave Equation
    d. Electromagnetic Plane Waves
5. Fields and Waves in Material Media
    a. Electric and Magnetic Materials
    b. Plane Waves in Dielectrics and Conductors
    c. Boundary Conditions
    d. Reflection and Transmission of Plane Waves

**Assignments & Exam Schedule:**

*No Classes:* Monday, Jan 21st – Martin Luther King, Jr. Day
Monday, Mar 18th though Saturday, Mar 23rd – Spring Break

Homework will be assigned on a regular basis, typically assigned on Tuesdays, and due the following Tuesday.

| | | |
|---|---|---|
| *Exam Dates:* | Exam #1 | Thursday, February 21st |
| | Exam #2 | Thursday, April 4th |
| | Final Exam | TBD |

Exams will be closed book; one sheet of notes will be allowed for each regular exam; two sheets of notes will be allowed for the final exam. The final exam will be comprehensive.

**Grading Policy:**

| | |
|---|---|
| Homework: | 10% |
| Exams (2): | 30% |
| Final Exam: | 30% |

**Course Policies:**

*Make-up exams*
Only by permission of the instructor in advance
*Extra Credit*
None
*Late Work*
Homework will be due at the beginning of the class period on the assigned due date; late homework will not be graded without a valid excuse (preferably arranged in advance).

**UT Dallas Syllabus Policies and Procedure:**

> The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.
>
> Please go to http://go.utdallas.edu/syllabus-policies for these policies.

***The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.***