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| **Course** | ECE 31100 - Electric and Magnetic Fields |
| **Type of Course** | Required for the EE Program; Elective for the CmpE Program |
| **Catalog Description** | Continued study of vector calculus, electrostatics, and magnetostatics. Maxwell’s equations. Introduction to electromagnetic waves, transmission lines, and radiation from antennas. |
| **Credits** | 3 |
| **Contact Hours** | 3 |
| **Prerequisite Courses** | MA 36300, PHYS 25100 |
| **Corequisite Courses** | None |
| **Prerequisites by Topics** | Knowledge of elementary electrostatics, current electricity, electromagnetism, magnetic properties of matter, geometrical and physical optics. Knowledge of first and higher order differential equations, systems of first order equations, series solutions, integral transforms. Introduction to partial differential equations: separation of variables, Fourier series, Sturm-Liouville equations. |
| **Textbook** | David K. Cheng, *Fundamentals of Engineering Electromagnetics*, Prentice Hall; 1993. |
| **Course Objectives** | Introduce students to a fundamental knowledge of electromagnetic fields, and help them to develop problem solving skills in the area of electromagnetics by applying mathematics, science, and engineering knowledge, to identify, formulate and solve engineering problems. |
| **Course Outcomes** | Students who successfully complete this course will have demonstrated:   1. an ability to work with electrostatic fields and to be able to find electric and potential fields from charge distributions including the presence of dielectric materials **[1]** 2. an ability to work with magnetostatics fields and to be able to find magnetic fields from current distributions including the presence of magnetic materials **[1]** 3. an ability to work with time varying fields including wave propagation **[1]** 4. an ability to work with transmission lines in the time and frequency domains **[1]** |
| **Lecture Topics** | * Complex vector algebra and calculus * Static electric field * Static magnetic field * Time varying fields and Maxwell’s equations * Plane wave in lossless and lossy media * Wave Polarization * Transmission line theory |
| **Computer Usage** | Medium |
| **Laboratory Experience** | None |
| **Design Experience** | None |
| **Coordinator** | Todor Cooklev |
| **Date** | September 30, 2018 |