

## **ECE 507: Seminar on Electromagnetic Scattering Theory**

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### **Course Description:**

This course is a special topics seminar that will introduce the aspects related to the volume and boundary scattering of electromagnetic waves. Based on the Maxwell's Equations and Greens function as well as radiative transfer theory, the approaches are developed to solve the problem of finding the scattered electromagnetic field for the cases: single and multiple scattering, discrete and continuous media, as well as boundary scattering for various types of surface roughness. The course will provide the mathematical techniques applicable to basic scattering tasks.

### **Material Covered:**

- Random Rough Surface Scattering: SPM, Kirchhoff method, Review of other methods(chap.8-9 v.1).
- Electromagnetic Scattering by Single Particle (chap.1 v.1)
- Basic Theory of Electromagnetic Scattering; (chap.2 v.1)
- Fundamentals of Random Scattering (chap.3 v.1)
- Single Scattering and Applications (chap.6 v.1)
- Discrete Media (chap.5 v.3)
- Dense media (chap.4) (chap.6,7 v. 3)
- Radiative Transfer Theory; (chap.7 v.1)
- Solution Techniques of Radiative Transfer Theory (chap.7,8 v.1)
- Coherent Effects; Some Examples of scattering (chap.6, 10, v.1) (chap.6,8 v.3)

### **Course Text:**

1. Scattering of Electromagnetic Waves, Theories and Applications, v.1, by Leung Tsang, Jin Au Kong, Kung-Hau Ding; John Wiley & Sons, 2001, ISBNs: 0-471-38800-9
2. Scattering of Electromagnetic Waves, Advanced Topics, v.3, by Leung Tsang, Jin Au Kong, John Wiley & Sons, 2001, ISBNs: 0-471-38801-7
3. Wave Propagation and Scattering in Random Media, by A. Ishimaru