

Syllabus

교과목명: Electrical, magnetic, and optical properties of materials (재료의 전자기적 성질)

교과목번호: 445.312 강좌번호: 학점: 3

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수강대상: 3학년 선수과목: 재료현대물리, 양자역학

강의시간: 월, 수 09:30~10:45 강의실: 33동 327호

강의조교:

강좌관련 홈페이지:

면담시간 (office hour): 먼저 email로 면담시간 요청하여 진행 (gwanlee@snu.ac.kr)

□ 교과목 목표

Understanding of electrical, optical, magnetic, and thermal properties of materials through quantum mechanics

□ 교과목 개요 및 활용분야

Studying electromagnetic and matter waves using quantum mechanics and electrical, optical, magnetic, and thermal properties of materials

This is a mandatory class for junior who need to understand electrical, optical, magnetic, and thermal properties of materials that are required for information technology. In this regard, we will study behaviors of atoms and electrons in solids by using quantum mechanics. The class would be helpful as a fundamental lecture for electronic materials, optical materials, and magnetic materials, which are applicable for semiconductor devices and thin film devices.

□ 주교재 및 참고문헌

주교재: Electrons in Solids, 3rd Ed., Richard H. Bube, Academic Press

부교재: Electronic Properties of Materials, 3rd Ed., Rolf E. Hummel, Springer

Introduction to Magnetic Materials, B. D, Cullity

Physics of Magnetism, S. Chikazumi

Modern optics, R. D. Guenther, John Wiley & Sons

Elementary Solid State Physics, M. A. Omar, Addison-Wesley Pub. Co.

□ 학습평가 및 방법

mid-term exam #1 (30%), mid-term exam #2 (30%), final exam (30%), Homework (10%)

A(~30%), B(~30%), C(~30%), D and lower(~10%)

□ 강의진행계획

Chapter 1. Overview of quantum mechanics

Chapter 2. Quantum theory of solids

- midterm exam #1

Chapter 3. Electrical conduction in solids

- midterm exam #2

Chapter 4. Optical properties

Chapter 5. Magnetic properties

- Final exam