

# Syllabus

## Nano-Optics

Course Name	Course type (credit/hours)	전선(3/3)		Course code		
	Target students Division/major/grade	/		Opening semester	2017년 2학기	
	Class time and classroom	화6(원242) 화7(원242) 화8(원242)(원242)				
Reference to this course	Related basic courses					
	Recommended concurrent courses					
	Related advanced courses					
Instructor	Name (title/division)					
	Office Room Number		Office phone Number	031-219-2740	e-mail	kjahn@ajou.ac.kr
	Office hours			Homepage address		
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

### 1. Introduction

By virtue of highly developed nanotechniques in material and optical science, new optical phenomenon such as surface plasmonics and metamaterials emerged. Nano-optics are multidisciplinary research area covering all optical phenomenon on a nanometer size scale. They include not only the generation and guiding of light but the light-matter interaction in deep subwavelength regimes.

In this one-semester course for graduate students a general overview and a few selected topics which are recently focused in Nano-optics will be provided. The course is composed of three part. In the first part the topics relating with classical electromagnetic waves, in the second part the ones in close connection with quantum mechanics, and finally, metamaterials will be discussed.

### 2. Course Objectives

### 3. Class types and activities

#### 4. Teaching Method

Lectures and seminars by participants

#### 5. Knowledge and ability required for taking this course

#### 6. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam			
final exam			
quiz			
presentation			
discussion			
homework			
etc			

seminar presentation 40% + final exam 40% + attendance and enthusiasm 20%

## 7. Textbooks

Main/Sub	Title	Writer	Publisher	Publication year
주교재	Lecture Notes			
부교재	Principles of Nano-Optics	L. Novotny, B. Hecht	Cambridge Uni Press	2006
부교재	Plasmonics	S. A. Maier	Springer	2007
부교재	Absorption and scattering of light by small particles	C. F. Bohren, D. R. Huffman	Wiley-VCH	2004
부교재	Quantum Optics	M. O. Scully, M. S. Zubairy	Cambridge Uni Press	2001
부교재	Tutorials in Metamaterials (Series in Nano-Optics and Nanophotonics)	M. A. Noginov, V. A. Podolskiy	CRC Press	2011

## 8. Lecture Schedule

Week	Lecture contents	Lesson type	Remark
1	Introduction to the course and Nano-optics	Lectures	
2	Recent Progress in Nano-optics	Lectures	
3	Refreshing classical electrodynamics	Lectures	
4	Near-field optics	Lectures	
5	Surface Plasmonics 1	Lectures	
6	Surface Plasmonics 2	Lectures	
7	Nanoresonators	Lectures	
8	Midterm exam		
9	Photonic Crystals	Lectures	
10	Quantum optics 1	Lectures	
11	Quantum optics 2	Lectures	
12	Quantum optics 3	Lectures	
13	Low-dimensional semiconductors	Lectures	
14	Metamaterials 1	Lectures	
15	Metamaterials 2	Lectures	
16	Final exam		

## 9. Others

Students are requested to have fundamental knowledge on classical electromagnetics, quantum mechanics, and solid state physics.