

# SYLLABUS

<b>Classification</b>	Elective	<b>Course No.</b> 11602	<b>Cr. Hrs.</b> 3	<b>Instructor</b> Byeong Ha Lee
<b>Course Title</b>	<b>Korean</b>	전자기학		
	<b>English</b>	Electromagnetics		
<b>Course Outline</b> Electrostatics in dielectric media, currents and magnetic fields, Maxwell's equations, Propagation of electromagnetic wave through dispersive media, Scattering and Radiation				
<b>Prerequisite</b>				
<b>Textbook and References</b>		Foundation of electromagnetic theory, 4 <sup>th</sup> edition, J. R. Reitz, F. J. Milford, R. W. Christy Engineering electromagnetics, 5 <sup>th</sup> edition, W. H. Hayt, Jr.		
<b>Weekly Course Schedule</b>				
<b>Calendar</b>	<b>Description</b>			<b>Remarks</b>
1st week	Introduction to Electrostatics			
2nd week	Electro static energy and potential			
3rd week	Electrostatic field in dielectric and conducting media			
4th week	Solution of electrostatic problems			
5th week	Experimental mapping methods			
6th week	Magnetic fields of steady currents			
7th week	Magnetic energy, force, and inductance			
8th week	Midterm Exam			
9th week	Time varying fields and Maxwell's equations			
10th week	Propagation of monochromatic plane electromagnetic wave			
11th week	Monochromatic plane waves in bounded regions			
12th week	Spherical electromagnetic waves			
13th week	Dispersion and Oscillating fields in dispersive media			*
14th week	The emission of radiation			*
15th week	Transmission line			*
16th week	Final Exam			*

\* If there will be experiments, mark it in the "Remarks".

**Instructor**

Byeong Ha Lee (seal)

**Dept. Chair**

Noh, Do Young (seal)

# SYLLABUS

<b>Classification</b>	Elective	<b>Course No.</b> 2607 (03675)	<b>Cr. Hrs.</b>	3	<b>Instructor</b>	Noh, Do Young
<b>Course Title</b>	<b>Korean</b>	고체 물리				
	<b>English</b>	Solid State Physics				
<b><u>Course Outline</u></b> In this course, basic physical concepts in understanding solids, crystals and electrons in crystals, will be discussed at introductory level. After studying the concepts of crystal structures and the reciprocal lattice, we will study the thermal vibrations and properties of phonon, electronic energy band structure, basic concepts of semiconductor crystal and metal crystals. Advanced topics such as magnetism and superconductivity will be covered at the end of the semester. Recommended to graduate students in physics and materials science.						
<b>Prerequisite</b>						
<b>Textbook and References</b>		Introduction to Solid State Physics, by Kittel (Text)				
<b>Weekly Course Schedule</b>						
<b>Calendar</b>	<b>Description</b>				<b>*Remarks</b>	
<b>1st week</b>	Crystal Structure					
<b>2nd week</b>	Crystal Structure / Reciprocal Lattice					
<b>3rd week</b>	X-ray Diffraction					
<b>4th week</b>	Crystal Binding					
<b>5th week</b>	Lattice Vibrations					
<b>6th week</b>	Phonon					
<b>7th week</b>	Free Electron Gas					
<b>8th week</b>	Free Electron Gas / Energy Band				Midterm Exam	
<b>9th week</b>	Energy Band					
<b>10th week</b>	Semiconductor Crystals					
<b>11th week</b>	Semiconductor Crystals					
<b>12th week</b>	Fermi Surface and Metals					
<b>13th week</b>	Magnetism					
<b>14th week</b>	Magnetism					
<b>15th week</b>	Dielectric properties and Ferroelectricity					
<b>16th week</b>	Superconductivity				Final Exam	

\* If there will be experiments, mark it in the "Remarks".

Instructor Noh, Do Young  (Seal)

Dept. Chair Noh, Do Young  (Seal)

# SYLLABUS

<b>Classification</b>	Elective	<b>Course No.</b> 21603 (03628)	<b>Cr. Hrs.</b>	3	<b>Instructor</b>	Kim, Won Bae
<b>Course Title</b>	<b>Korean</b>	고체전기화학				
	<b>English</b>	Solid State Electrochemistry				
<b><u>Course Outline</u></b> This course aims to present the fundamentals and experimental techniques of solid state electrochemistry, the backgrounds of ionic or electronic conduction of inorganic & polymeric materials, and the applications in the areas of batteries, fuel cells, electrochemical photonics, sensors and corrosion.						
<b>Prerequisite</b>						
<b>Textbook and References</b>		P. G. Bruce, Solid State Electrochemistry				
<b>Weekly Course Schedule</b>						
<b>Calendar</b>	<b>Description</b>					<b>*Remarks</b>
<b>1st week</b>	Principles of electrochemistry 1					
<b>2nd week</b>	Principles of electrochemistry 2					
<b>3rd week</b>	Experimental methods of electrochemistry 1					
<b>4th week</b>	Experimental methods of electrochemistry 2					
<b>5th week</b>	Solid state background					
<b>6th week</b>	Ionic conductors 1. crystalline solid electrolytes					
<b>7th week</b>	Ionic conductors 2. polymer electrolytes					
<b>8th week</b>	Mixed ionic-electronic conductors					
<b>9th week</b>	mid-term exam					
<b>10th week</b>	Electrode materials 1					
<b>11th week</b>	Electrode materials 2					
<b>12th week</b>	Batteries & fuel cells					
<b>13th week</b>	Electrochromic devices & photonic electrochemistry					
<b>14th week</b>	Sensors & monitoring techniques					
<b>15th week</b>	Corrosion & its control					
<b>16th week</b>	Review & final exam					

\* If there will be experiments, mark it in the "Remarks".

Instructor Kim, Won Bae (Seal)

Dept. Chair Noh, Do Young (Seal)

# SYLLABUS

<b>Classification</b>	Elective	<b>Course No.</b> 20000 (03621)	<b>Cr. Hrs.</b>	3	<b>Instructor</b>	Lee, Kwanghee
<b>Course Title</b>	<b>Korean</b>	유기물 광전자 I				
	<b>English</b>	Organic Materials for Electronics and Photonics I				
<b>Course Outline</b>						
The main purpose of this course is to understand basic concepts, mechanisms, and current issues in Polymer Electronics and Optoelectronics, so called 'Plastic Electronics', which utilizes novel materials exhibiting the electrical and optical properties of metals or semiconductors 'and' which retain the attractive mechanical properties and processing advantages of polymers.						
<b>Prerequisite</b>		"Introduction to Solid State Physics" (C. Kittel)				
<b>Textbook and References</b>		- Pope and Swenberg, "Electronic Processes in Organic Crystals and Polymers", Second Edition, Oxford Univ. Press, 1999. - Hadziioannou and P.F. van Hutten (eds), 'Semiconducting Polymers', Wiley-VCH, 2000.				
<b>Weekly Course Schedule</b>						
<b>Calendar</b>	<b>Description</b>					<b>*Remarks</b>
<b>1st week</b>	Introduction: Vision of 'Plastic Electronics'					
<b>2nd week</b>	Semiconducting Polymers I: Basic					
<b>3rd week</b>	Semiconducting Polymers II: Electronic Structure					
<b>4th week</b>	Semiconducting Polymers III: Bond Relaxation					Quiz 1
<b>5th week</b>	Semiconducting Polymers IV: Photoexcitation					
<b>6th week</b>	Semiconducting Polymers V: Photoinduced Charge Transfer					
<b>7th week</b>	Metallic Polymers I: Basic					
<b>8th week</b>	Metallic Polymers II: Doping					Midterm
<b>9th week</b>	Metallic Polymers III: Metal-Insulator Transition					
<b>10th week</b>	Metallic Polymers IV: True Metallic Transport					
<b>11th week</b>	Polymer Light-emitting Diodes I: Basic					
<b>12th week</b>	Polymer Light-Emitting Diodes II: Advanced					Quiz2
<b>13th week</b>	Polymer Solar Cells I: Basic					
<b>14th week</b>	Polymer Solar Cells II: Advanced					
<b>15th week</b>	Polymer Field-Effect Transistors I: Basic					
<b>16th week</b>	Polymer Field-Effect Transistors II: Advanced					Final

\* If there will be experiments, mark it in the "Remarks".

Instructor Lee, Kwanghee

Dept. Chair Noh, Do Young



# SYLLABUS

Classification	Elective	Course No.	26609	Cr. Hrs.	3:0:3	Instructor	K.A.Janulewicz
Course Title	Korean	파동 광학 (2630)					
	English	Wave Optics					
<b>Course Outline</b> The main goal of the course is to deliver students comprehensive and homogeneous theory of wave optics. This kind of optics constitutes physical (experimental and theoretical) foundations of modern optics-oriented technological fields such as photonics, noninvasive diagnostics, computer vision, optical metrology etc. The fundamental physical processes being a basis of these and other applications are analysed in detail under the point of view of their applicability in practice.							
Prerequisite							
Textbook and References		M. Born E. Wolf "Principles of Optics", E. Hecht "Optics" (4 <sup>th</sup> ed.)E. Wolf, L. Mandel "Coherence and Quantum Optics"					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Basic elements of classic description of electromagnetic field						
2nd week	Electromagnetic Interpretation of selected light phenomena						
3rd week	Gaussian beams						
4th week	Interference						
5th week	Diffraction theory I						
6th week	Diffraction theory II						
7th week	Scattering of light						
8th week	Midterm exam						
9th week	Introduction to statistical optics						
10th week	Coherence						
11th week	Speckle						
12th week	Elements of nonlinear optics						
13th week	Elements of crystalline optics						
14th week	Physical backgrounds of holography						
15th week	Approximation of geometrical optics						
16th week	Final exam						

\* If there will be experiments, mark it in the "Remarks".

Instructor K.A.Janulewicz



Dept. Chair Noh, Do Young



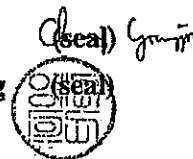
# SYLLABUS

Classification	Elective	Course No. 11659	Cr. Hrs.	3	Instructor	Youngjoo Chung
Course Title	Korean	광학과 레이저				
	English	Optics and Lasers				
Course Outline Review of electromagnetic theory, light propagation, geometrical optics, polarization, interference, wave optics, coherence, light amplification, characteristics of lasers, Q-switching, passive and active mode-locking						
Prerequisite		Electromagnetics				
Textbook and References		Textbook: Pedrotti & Pedrotti, Introduction to Optics, 2nd ed. References: Born and Wolf, Principles of Optics, 7th ed. E. Hecht, Optics A. Yariv & P. Yeh, Optical Waves in Crystals A. E. Siegman, Lasers				
Weekly Course Schedule						
Calendar	Description				Remarks	
1st week	Historical review and background					
2nd week	Geometrical optics					
3rd week	Matrix methods in paraxial optics					
4th week	Optical instrumentation					
5th week	Wave optics and superposition of waves					
6th week	Interference of light					
7th week	Coherence and holography, Mid-term					
8th week	Polarization					
9th week	Diffraction theory					
10th week	Theory of multilayer films					
11th week	Light amplification and basic of lasers					
12th week	Characteristics of lasers					
13th week	Fiber optics and Fourier optics					
14th week	Nonlinear optics					
15th week	Dead week					
16th week	Final Exam					

\* If there will be experiments, mark it in the "Remarks".

Instructor Youngjoo Chung

Dept. Chair Noh, Do Young



# SYLLABUS

Classification	Elective	Course No.	11609 (11403)	Cr. Hrs.	3:0:3	Instructor	Do-Kyeong Ko
Course Title	Korean	초고속 광학					
	English	Ultrafast optics					
<u>Course Outline</u> Theory and general properties of ultrashort laser pulses, dispersion, spatio-temporal characteristics of the light, measurement techniques of the ultashort pulses, ultrafast laser spectroscopy, stretching, amplification, and the compression of the ultrashort pulses will be described and emphasized in the course.							
Prerequisite		Optics and Laser					
Textbook and References		<ul style="list-style-type: none"><li>- Femtosecond Laser Pulses(by Claude Rulliers, Springer, 1998)</li><li>- Ultrashort Laser Pulse Phenomena(by Jean-Claude Diels &amp; Wolfgang Rudoiph, Academic Press Inc., 1996)</li><li>- Frequency-Resolved Optical Grating : The Measurement of Ultrashort Laser Pulses(by Rick Trebino, Kluwer Academic Publishers, 2002)</li></ul>					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Introduction to Ultrafast Optics						
2nd week	The Generation of Ultrashort Laser Pulses						
3rd week	Ultrashort Laser Pulses I						
4th week	Ultrashort Laser Pulses II						
5th week	Dispersion of Ultrashort Pulses						
6th week	Spatio-Temporal Characteristics of Light and Light and How to Model Them						
7th week	Nonlinear Optics						
8th week	Midterm exam						
9th week	Ultrafast Laser Spectroscopy						
10th week	Coherent and Incoherent Control						
11th week	Theory of Ultrashort Laser Pulses Generation						
12th week	The Amplification of Ultrashort Laser Pulses						
13th week	Focusing Ultrashort Pulses						
14th week	Measuring Ultrashort Laser Pulses						
15th week	Ultrashort Optics Lab Tour						
16th week	Final exam						

\* If there will be experiments, mark it in the "Remarks".

Instructor Do-Kyeong Ko



Dept. Chair Noh, Do Young

