

SYLLABUS

Classification	Elective	Course No.	22604 C11653	Cr. Hrs.	3:0:3	Instructor	Yong-Tak Lee
Course Title	Korean	광전자공학					
	English	Optoelectronics					
Course Outline : Optical processes in semiconductor, heterojunction, LED, laser diode operation theory and structures, laser diode modulation, photodetectors, optical amplifier, optoelectronic modulation and switching devices, OEICs.							
Prerequisite		Semiconductor Physics (1648)					
Textbook and References		1. Class Note 2. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall, 1994. 3. Selected papers.					
Weekly Course Schedule							
Calendar	Description						Remarks
1st week	Fundamentals of compound semiconductors						
2nd week	Optical processes in semiconductors						
3rd week	Heterojunctions						
4th week	Light emitting diodes						
5th week	Laser diode : Operation theory						
6th week	Laser diode structures						
7th week	Advanced laser diode structure						
8th week	Mid-term Exam						
9th week	Modulation of laser diode						
10th week	Photodiodes : Principle and structure						
11th week	High speed detection techniques						
12th week	Optoelectronic modulator						
13th week	Optical amplifier						
14th week	Optical switch and logic devices						
15th week	Optoelectronic integrated circuits						
16th week	Final Exam						

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

Coordinator Yong-Tak Lee

Photonics School, Director Won-Taek Han



SYLLABUS

Classification	Selective	Course No.	2605 (11654)	Cr. Hrs.	3:0:3	Instructor	Young-Dahl Jho
Course Title	Korean	양자 역학					
	English	Quantum Physics for Engineering					
Course Outline (국문) 소자 물리나 광공학 소자 등의 연구에 필요한 양자 역학과 고체 물리의 기본적인 토대를 제공하는 과목입니다. 다룰 문제들은 다음을 포함합니다: Schrodinger 파동식; 반도체에서 에너지 준위; 이성질 구조에서 크로니그-페니 모델; 터널링 효과; 반도체에서 불순물과 엑시톤; 반도체에서 스핀-궤도 상호작용; 정상 상태에 대한 근사 방법; 시간에 의존하는 문제에 대한 근사 방법과 광학적 전이; 입자의 산란; 강자성과 자기 기록; NMR과 자기 공명 영상; 반도체 레이저; 나노 광공학 소개 (영문) This course provides the background in quantum mechanics and solid state physics necessary for further studies in device physics and photonics devices. Examples include: electronic energy levels in semiconductor transistors; the Kronig-Penney model for heterostructures; tunneling phenomena in semiconductor devices; impurities and excitons in semiconductors; effects of spin-orbit interactions in semiconductors; time-dependent perturbation theory and optical transitions; carrier scattering processes; ferromagnetism and magnetic recording; nuclear magnetic resonance and magnetic resonance imaging; semiconductor lasers; and introduction to nanophotonics.							
Prerequisite	전자기학 (Electricity and Magnetism), 고급 수학 (Advanced Calculus)						
Textbook and References	Textbook: Quantum Mechanics: Fundamentals & Applications to Technology by J. Singh (John Wiley & Sons, 1999). USEFUL REFERENCES: Modern Quantum Mechanics by J. J. Sakurai (Addison-Wesley, 1994). The Meaning of Quantum Theory by J. Baggott (Oxford University Press, 1992). Electrical Properties of Materials, Sixth Edition by L. Solymar and D. Walsh (Oxford University Press, 1998). Introduction to the Electronic Properties of Materials by D. Jiles (Chapman & Hall, 1994). Electrons in Solids by R. H. Bube (Academic Press, 1992). Introduction to Solid State Physics, 7th Edition by C. Kittel (John Wiley & Sons, 1996). Solid State Physics by N. W. Ashcroft and N. D. Mermin (Holt, Rinehart and Winston, 1976). Future Trends in Microelectronics: The Road Ahead edited by S. Luryi, J. Xu and A. Zaslavsky (John Wiley & Sons, 1999). Quantum Mechanics: For Engineering, Materials Science and Applied Physics by H. Kroemer (Prentice Hall, 1994). Physics of Semiconductors and Their Heterostructures by J. Singh (McGraw-Hill, 1993). An Introduction to Theory and Applications of Quantum Mechanics by A. Yariv (John Wiley & Sons, 1982).						
	Weekly Course Schedule						
	Calendar	Description					Remarks
	1st week	Review of classical mechanics					
	2nd week	Mathematical formulation of quantum mechanics					
	3rd week	Atoms, molecules, and lattice					
	4th week	Particles in simple potentials					
	5th week	Tunneling problem					
	6th week	Particles in spherically symmetric potentials					
	7th week	Operators, symmetry and conservation					
8th week	Mid-term exam						
9th week	Identical particles and 2nd quantization						
10th week	Approximation: time-independent problems						
11th week	Approximation: time-dependent problems						
12th week	Collision and scatterings						
13th week	Magnetic effects						
14th week	Overview of semiconductor laser and optics						
15th week	Introduction to nanophotonics.						
16th week	Final exam						

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

Coordinator Young-Dahl Jho (seal)
Dept. Chair Yong-Tak Lee (seal)

SYLLABUS

Classification	Elective	Course No.	22609	Cr. Hrs.	3:0:3	Instructor	Byeong Ha Lee
Course Title	Korean	광도파로 이론					
	English	Optical Waveguide Theory					
<u>Course Outline</u> : Study of the coupled-mode theory, optical waveguides, phase matching, dispersion relationship, arrayed waveguides, fiber gratings, couplers. Discussion of their applications on the telecommunication and sensin							
Prerequisite							
Textbook and References		Main: Optical Waves in Crystal (A. Yariv, P. Yeh)					
		Sub 1: Theory of Dielectric Optical Waveguides (Dietrich Marcuse)					
		Sub 2: Foundations of Electromagnetic Theory (John R. Reitz)					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Introduction and Boundary conditions of waveguides						
2nd week	Boundary conditions of waveguide						
3rd week	Helmholtz equation						
4th week	Dispersion of Optical Material						
5th week	Propagation of plane wave						
6th week	Planar waveguides						
7th week	Cylindrical waveguides						
8th week	Midterm Exam						
9-10th week	Coupled-mode theory						
11-12th week	Mode Coupling by Fiber gratings						
13th week	Cascaded Fiber Grating						
14th week	Mode coupling devices						
15th week	Presentation of Term Project						
16th week	Final Exam						

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

Coordinat Byeong Ha Lee
 Photonics School, Director Won-Taek Han



SYLLABUS

Classification	Elective	Course No.	22610	Cr. Hrs.	3:0:3	Instructor	Do-Kyeong Ko
Course Title	Korean	고급 레이저 응용					
	English	Advanced Laser Systems and their applications					
Course Outline In the first half of the course, the general theories of lasers, how they work, including Paraxial wave eq., Fabry-Perot Interferometer, homo- and inhomogeneous broadening, and laser amplification with small and high gain. And a more advanced treatment of laser physics with emphasis on dynamic, transient and nonlinear effects will be contained in the 2nd half of the course.							
Prerequisite		Optics and Lasers (1659)					
Textbook and References		Lecture notes will be given Lasers (Siegman) University Science Book co. Lasers Electronics (Verdeyen) prentice Hall					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Introduction to Lasers						
2nd week	Basic Laser Physics						
3rd week	PWE & Gaussian beams						
4th week	Fabry Perot Interferometers, Guoy Phase						
5th week	absorption, emission, lifetime						
6th week	homogeneous & inhomogeneous broadening						
7th week	High gain, Rigrod analysis						
8th week	Mid-term exam						
9th week	laser oscillation, frequency puling, Q value						
10th week	Laser Dynamics						
11th week	rate equations, relaxation oscillation						
12th week	Quantative analysis of Q switching						
13th week	mode competition						
14th week	mode locking						
15th week	presentation of the term projects						
16th week	Final exam						

* If there will be experiments, describe them in the "Remarks".

Coordinator

Do-Kyeong Ko

(seal)

Photonics School, Director Won-Taek Han (seal)

SYLLABUS

Classification	Elective	Course No.	22613	Cr. Hrs.	3	Instructor	Dug Young Kim
Course Title	Korean	푸리에 광학					
	English	Fourier Optics and Adaptive Optics					
Course Outline : Applications of the Fourier transform and linear systems theory to the analysis of optical systems such as wave propagation, diffraction, coherent and incoherent and incoherent imaging, pattern recognition and holography. Computational work will be emphasized.							
Prerequisite		Graduate standing (Any level of graduate student may attend the course)					
Textbook and References		Text : Goodman, Introduction to Fourier Optics, McGraw-Hill					
		Referencess :					
		-R.G.Wilson, Fourier Series and Optical Transform Techniques in Contemporary Optics, John Wiley & Sons -B.Bradley, Signal Processing using Optics, Oxford Univ. Press					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Groundwork						
2nd week	Groundwork						
3rd week	Fourier Transformation						
4th week	Fourier Transformation						
5th week	Linear Systems						
6th week	Linear Systems						
7th week	Linear Filters						
8th week	Phasor Representation of Monochromatic Waves					Midterm Exam	
9th week	Diffraction						
10th week	Lenses						
11th week	Coherent Image Formation						
12th week	Coherent Image Formation						
13th week	Incoherent Image Formation						
14th week	Incoherent Image Formation						
15th week	Holography and Wavefront Reconstruction						
16th week	Final Exam						

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

Instructor Dug Young Kim
Photonics School, Director Won-Taek Han



SYLLABUS

Classification	Elective	Course No.	2618 (15818)	Cr. Hrs.	3:0:3	Instructor	Jeong, Sungho
Course Title	Korean	레이저가공 및 원리					
	English	Laser Processing and Principles					
<u>Course Outline</u>							
Fundamental processes of laser-matter interaction during laser processing of solids including the conversion of light energy into heat, phase transform into liquid or vapor, and plasma generation above the irradiated surface are to be analyzed and formulated theoretically. Mathematical modeling and methods of numerical analysis of the thermophysical processes induced in the solid are introduced.							
Prerequisite	Laser Engineering(5613) is recommended						
Textbook and References	“Laser-beam interactions with materials :physical principles and applications”, Martin von Allmen, Andreas Blatter., Springer, 1995 Laser Processing and Chemistry, Dieter Bauerle, Springer, 2000 Numerical Heat Transfer and Fluid Flow, S.V. Patankar, Mc-Graw, 1980						

Weekly Course Schedule		
Calendar	Description	Remarks
1 st week	Introduction	
2 nd week	Fundamental optical properties	
3 rd week	Laser energy absorption and heating	
4 th week	Thermal modeling for temperature distribution	
5 th week	Finite difference method for numerical analysis	
6 th week	Laser-induced melting and evaporation	
7 th week	Numerical methods for phase change problems	
8 th week	Mid-term exam	
9 th week	Laser ablation	
10 th week	Plasma formation and interaction with laser beam	
11 th week	Nonequilibrium processes	
12 th week	Photochemical etching with laser beam	
13 th week	Photochemical deposition with laser beam	
14 th week	Ultrafast laser processing	
15 th week	Experimental techniques	
16 th week	Final exam	

(Course Policy)

- Mathematical modeling and FDM simulation will be practiced.
- Need skills with computation language or software are necessary
- Questions will be asked in-class and will be included in the final evaluation

Instructor

Jeong, Sungho



Dept. Chair

Lee, Jong-Hyun



SYLLABUS

Classification	Elective	Course No.	SY-10 (03648)	Cr. Hrs.	3	Instructor	Noh, Do Young
Course Title	Korean	고급 X-ray 회절론					
	English	Modern X-ray Diffraction					
<p>Course Outline X-선의 물리적 성질과 방사광을 비롯한 X-선 발생 원리를 강의한 후, X-선과 물질의 상호작용을 기반으로 X-선 회절의 원리를 강의한다. 또한 소각산란, X-선 반사율, order-disorder, 박막의 stress 분석기법 및 프론티어 방사광 X-선 회절 기법 등을 강의한다. 이러한 토픽들은 표면 및 계면, 그리고 박막의 구조 등 다양한 연구 주제에 응용될 수 있다.</p> <p>The course starts with studying the characteristics of x-rays and x-ray generation methods including synchrotron. Basic interaction between x-rays and matter will be discussed to understand the principle of x-ray diffraction. As advanced topics, small angle scattering, x-ray reflectivity, order-disorder transition, and stress analysis of thin films, advanced synchrotron techniques will be covered. These topics might be applied to understand the structural aspects of surfaces and interfaces of thin crystal films.</p>							
Prerequisite		None					
Textbook and References.		1. B. E. Warren X-ray Diffraction 2. B. D. Cullity Elements of X-ray Diffraction					
Weekly Course Schedule							
Calendar	Description					*Remarks	
1st week	Properties of X-rays						
2nd week	Synchrotron X-rays						
3rd week	X-ray Scattering by Atoms						
4th week	Reciprocal Lattice Space						
5th week	Single Crystal X-ray Diffraction						
6th week	Thermal vibration and diffuse scattering						
7th week	Integrated Intensity						
8th week	Experimental methods						
9th week	X-ray studies of order-disorder						
10th week	Residual stress measurement						
11th week	Surface X-ray Scattering						
12th week	X-ray Reflectivity (1)						
13th week	X-ray Reflectivity (2)						
14th week	Small Angle X-ray Scattering (1)						
15th week	Small Angle X-ray Scattering (2)						
16th week	Advanced Synchrotron X-ray Scattering method						

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

Instructor Noh, Do Young (Seal)

Dept. Chair (Seal)

SYLLABUS

Classification	Selective	Course No.	28623 7653	Cr. Hrs.	3	Instructor	Young J. Kim
Course Title	Korean	대기오염 모니터링					
	English	Air Pollution Monitoring					
<u>Course Outline :</u> This course covers operational principles and applications of monitoring techniques for gaseous and particulate air pollutants.							
Prerequisite		None					
Textbook and References		Course material					
Weekly Course Schedule							
Calendar	Description						Lecturers
1st week	Introduction						
2nd week	Fundamental of Air Sampling						
3rd week	Monitoring of Criteria Gaseous Air Pollutants: Reference Methods						
4th week	PM Mass Monitoring: Reference and Equivalent Methods						
5th week	Measurement of Atmospheric Particles: Physical Properties						
6th week	Measurement of Atmospheric Particles: Chemical Composition						
7th week	Aerosol Optical Properties and Visibility						
8th week	Continuous Emission Monitoring						
9th week	Mid-Term						
10th week	Active Optical Remote Sensing : DOAS						
11th week	Active Optical Remote Sensing : LIDAR						
12th week	Passive Remote Sensing: Sunphotometry						
13th week	Passive Remote Sensing: Satellites						
14th week	Atmospheric Composition Change Monitoring						
15th week	Recent Developments in Air Quality Monitoring						
16th week	Final Exam						

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

Instructor Young J. Kim (seal)
 Dept. Chair (seal)

SYLLABUS

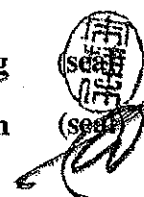
Classification	Elective	Course No.	22624	Cr. Hrs.	3	Instructor	G. Hugh Song
Course Title	Korean	양자광학 통신 개론					
	English	Introduction to Quantum Optical Communications					
Course Outline 1. Dirac notations for quantum-mechanical harmonic oscillator, the basic concept for squeezed states. 2. Basic principles of homodyne/heterodyne detection as quantum detection. 3. $\chi^{(2)}$ -nonlinear optics for twin-beam generation. 4. Quantum systems theory which includes topics such as optimum binary detection, quantum cryptography and quantum teleportation							
Prerequisite		quantum physics(22605), optics and laser (22606)					
Textbook and References		textbook: Classnote /Viewgraphs by G. Hugh Song Reference: H. A. Haus, <i>Electromagnetic Noise and Quantum Optical Measurements</i> . L. Mandel and E. Wolf, <i>Optical Coherence and Quantum Optics</i> , Cambridge U. Press 1995.					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	coupled-mode equations for parametric interaction						
2nd week	Dirac notation for quantum mechanics						
3rd week	Harmonic oscillator states						
4th week	radiation field quantization						
5th week	Squeezed states						
6th week	$\chi^{(2)}$ -nonlinear nonlinear optics						
7th week	uncertainty principle for squeezed quantum states						
8th week							
9th week	quantum photodetection						
10th week	optical parametric amplifiers and generation of						
11th week	phase-matched interaction						
12th week	quantum system theory						
13th week	quantum binary detection						
14th week	quantum precision measurement						
15th week	quantum teleportation						
16th week							

Professor

G. Hugh Song

Photonics School, Director

Won-Taek Han



SYLLABUS

Classification	elective	Course No.	22629	Cr. Hrs.	3	Instructor	Hyyong Suk
Course Title	Korean	플라즈마 기초 및 광응용					
	English	Introduction to plasma physics and optical applications					
<u>Course Outline</u> This is an advanced course that requires undergraduate-level electromagnetics knowledge. It covers basic plasma physics phenomena, laser-plasmas and their applications.							
Prerequisite		undergraduate-level electromagnetics					
Textbook and References		Introduction to Plasma Physics and Controlled Fusion : Vol. 1 Plasma Physics by Francis F. Chen and other materials					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	introduction and plasma productions						
2nd week	single particle motion						
3rd week	"						
4th week	plasmas as fluids						
5th week	"						
6th week	waves in plasmas						
7th week	"						
8th week	mid-term exam						
9th week	diffusion and resistivity						
10th week	"						
11th week	equilibrium and stability						
12th week	kinetic theory						
13th week	laser-produced plasmas and their applications						
14th week	"						
15th week	"						
16th week	final exam						

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

Coordinator
Photonics School, Director

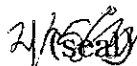
Hyyong Suk
Won-Taek Han




SYLLABUS

Classification	Elective	Course No.	22630	Cr. Hrs.	3	Instructor	S. Gee
Course Title	Korean	기초 양자 광학					
	English	Elements of Quantum Optics					
<u>Course Outline</u> 1. Review of quantum mechanics for laser 2. Atom field interaction 3. Coherent transients 4. Single mode laser theory 5. special topics (Quantum computation, EIT, and etc)							
Prerequisite		Basic level of quantum mechanics, Electrodynamics, Laser theory					
Textbook and References		"Elements of quantum optics," Meystre, Sargent "Laser Physics" Sargent, Scully, Lamb "Quantum Computation and Quantum Information," Isaac L. Chuang, Michael A. Nielsen					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Quantum mechanics review						
2nd week	Quantum mechanics review						
3rd week	Atom field interaction (Fermi golden rule)						
4th week	Atom field interaction (Rabi oscillation, dispersion relation)						
5th week	State vector (various representations)						
6th week	Density Matrix (Pure and mixed states)						
7th week	Atomic line width (T1 and T2 broadening)						
8th week	Mid term exam.						
9th week	Semiclassical Laser theory						
10th week	Semiclassical Laser theory						
11th week	Coherent transient (optical nutation, free induction decay)						
12th week	Coherent transient (photon echo)						
13th week	Special topics (electromagnetically induced transparency)						
14th week	Special topics (quantum gates)						
15th week	Special topics (quantum algorithm)						
16th week	Final exam.						

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

Coordinator Sangyoun Gee 

Photonics School, Director Won-Taek Han 

SYLLABUS

Classification	Elective	Course No.	22632	Cr. Hrs.	3:0:3	Instructor	K.A. Janulewicz
Course Title	Korean	현대광학실험론					
	English	Experimental methods of modern optics					
Course outline: Essential goal of this course is preparation students to an experimental work. The students will have an opportunity to learn theoretical principles of some fundamental measurement techniques including both electrical and optical methods. This laboratory practice-oriented part will be supported by the measurement theory and error analysis both at an elementary level. Visit in the Ultra-short Quantum Beam Facility (UQBF) laboratory is planned as an integral part of the course.							
Prerequisite							
Textbook and References		J.F. Rabek, "Experimental Methods in Photochemistry and Photophysics", JWiley&Sons 1982					
Weekly Course Schedule							
Calendar	Description					Remarks	
1 st week	Elements of the measurement theory						
2 nd week	Elementary error analysis						
3 rd week	Observable to be measured						
4 th week	Vacuum technology						
5 th week	Electric measurement technique						
6 th week	Elements of instrumental optics I						
7 th week	Elements of instrumental optics II						
8 th week	Non-invasive measurements						
9 th week	Detection technique/ Hetero- and homodyne, beating						
10 th week	CCD cameras/Image acquisition						
11 th week	Microscopy and interferometry						
12 th week	Spectroscopic technique/Pump-probe method						
13 th week	Correlation and streak techniques						
14 th week	Coherence and photon counting						
15 th week	QUBF laboratory session					Dr. Il Woo Choi	
16 th week	Final exam						

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

Coordinator **K.A. Janulewicz**
 Photonics School, Director **Won-Taek Han**




SYLLABUS

Classification	Elective	Course No.	263 4-1	Cr. Hrs.	3	Instructor	PhoST Faculty
Course Title	Korean	광과학기술 특론					
	English	Special Topics in Photonics					
Course Outline							
<p>"Special Topics in Photonics" introduces specific topics and recent progresses in broad range of photonics and applied optics researches to M.S. and Ph.D students. The class will be arranged upon available specific topics from the faculty members of PhoST.</p>							
Prerequisite		N/A					
Textbook and References		N/A					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week							
2nd week							
3rd week							
4th week							
5th week							
6th week							
7th week							
8th week							
9th week							
10th week							
11th week							
12th week							
13th week							
14th week							
15th week							
16th week							

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

Coordinator Won-Taek Han
Photonics School, Director Won-Taek Han



(seal)
(seal)

SYLLABUS

Classification	Elective	Course No.	22634	Cr. Hrs.	3	Instructor	Pramod R. Watekar
Course Title	Korean	광섬유 소자의 특성 및 응용 - 광학기기 특성					
	English	Engineering Simulation Techniques for Optical Fibers and Devices					
Course Outline Introduction to optical fibers, Propagation in arbitrary profile optical fibers, Er-doped optical fiber amplifiers, Tm-doped optical fiber amplifiers, Double-clad optical fibers, Optical fiber lasers at 1550 nm, Q-switching, Fiber Bragg gratings, Long period gratings, Quantum dots in optical fiber, Si-quantum dots doped optical fiber amplifier, Raman Amplifier, Optical fibers for FTTH applications, Introduction to magneto-optic effects in optical fiber, biomedical sensors							
Prerequisite		Knowledge of basic programming tools such as C, C++ or Mathematica is preferable					
Textbook and References		1. Introduction to Optical Fibers, Ghatak and Thyagarajan, Cambridge University Press, 1999. 2. Optical Fiber Amplifiers: Materials, Devices, and Applications, edited by S. Sudo, Artech House, Inc., 1997 3. Fiber-Optic Communication Systems, Govind P. Agrawal, John Wiley & Sons Inc, NY 2002.					
Weekly Course Schedule							
Calendar	Description						Remarks
1st week	General properties of optical fibers, Propagation properties and Simulation						
2nd week	Optical amplifiers: Gain, Saturation, Optimum Concentration, Noise Figure, Quantum efficiency						
3rd week	Optical amplifiers: Effect of various profiles on performance of amplifiers, Optimization						
4th week	Optical fiber lasers: Optical fiber lasers at 1064 nm, 1550 nm						
5th week	Ring lasers, Q-switched lasers, All optical Q-switched lasers and design						
6th week	Nonlinearity in the optical fibers						
7th week	Introduction to fiber optic sensors-I: Interferometric, current and rotation sensors						
8th week	Midterm Exam						
9th week	Introduction to fiber optic sensors-II :Biomedical sensors, stress/strain, position sensors						
10th week	FBG, LPG and applications, attenuators						
11th week	Quantum dots in Optical fiber : Optical amplifiers (Si-EDFA)						
12th week	Optical amplifiers using quantum dots-II : simplification of simulations						
13th week	Raman amplifier						
14th week	Specialty optical fiber designs for FTTH applications						
15th week	Magneto-optic effects in optical fiber, Parametric Amplifiers						
16th week	Final Exam						

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

Coordinator **Pramod R. Watekar**
 Photonics School, Director **Won-Taek Han**


 (seal)

 (seal)

SYLLABUS

Classification	elective	Course No.	22635	Cr. Hrs.	3	Instructor	Chul-Sik Kee
Course Title	Korean	수리물리					
	English	Mathematical Methods for Physics					
<u>Course Outline</u> This course provides graduate students with the mathematics which are required to study in electromagnetics, optics, quantum mechanics, and photonics, such as vector analysis, tensor analysis, determinants and matrices, differential equations, Fourier series, special functions, integral transformation, and so on.							
Prerequisite							
Textbook and References		Arfken, Mathematical methods for physicists (3rd Ed.) Academic Press Inc.					
Weekly Course Schedule							
Calendar	Description					Remarks	
1st week	Vector Analysis						
2nd week	Vector Analysis						
3rd week	Coordinate systems						
4th week	Tensor analysis						
5th week	Determinants and matrices I						
6th week	Determinants and matrices II						
7th week	Functions of a complex variable						
8th week	Midterm exam						
9th week	Differential equations I						
10th week	Differential equations II						
11th week	Green functions						
12th week	Bessel functions						
13th week	Legendre functions						
14th week	Fourier series						
15th week	Integral transforms						
16th week	Final exam						

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

Coordinator Chul-Sik Kee (seal)
 Photonics School, Director Won-Taek Han (seal)