

Syllabus [2025Year 2 Term]

Course Information

Course Title	Electrical Properties of Materials	Credits	3
Course Code	545730-1	Required/Elective (For Undergraduate Courses)	Selective majors
Department or Major	Convergent Systems Engineering	Language	English
Methods of Teaching		Lecture Room	수9,10,11,12,13,14(3공518)
Time Allotment	Lecture(3) Experiments(0) Training & Practice(0) Performance(0) Designing & Planning(0)	Cyber Lectures	
Course Type	offline		
Cyber Lectures Preview			

Lecturer

Lecturer	Name	LIU HAILIANG	Rank	Non-tenure track Assistant Professor	Final Academic Degree	공학박사
	Department & college	Research Institute for Industrial Technology		Office		
	Office Phone Number	—		e-mail	liuhailiang107@gmail.com	
	Field of Interest					

Course Summary

Course Description	This course mainly studies the physical basis of optoelectronic materials, device types and basic working principles, as well as related device system applications, providing key theoretical support for the design and research of related optoelectronic devices.
Description Related Courses	This course covers the physics foundations of semiconductor optoelectronic devices and semiconductor optoelectronic devices. The physics of semiconductor optoelectronic devices primarily covers the optical parameters of semiconductor materials, the light absorption and emission mechanisms of semiconductors, and the physical processes of photon-electron interactions in semiconductors. The semiconductor optoelectronic device section primarily covers the basic structures and operating principles of solar cells, photodetectors, photocouplers, and light-emitting diodes.

Course Goals	The task of this course is to understand and study the optoelectronic properties of semiconductors and the basic operating principles of semiconductor optoelectronic devices. Mastering these properties will help you understand the relationship between the microstructure and macroscopic performance of semiconductor optoelectronic materials.
Projected Results	The ultimate goal of this course is to enable students to fully understand and master the optoelectronic properties of semiconductor materials. Understanding these properties is key to driving the development of new materials. By optimizing the electronic properties of materials, more efficient and reliable electronic devices can be designed. This, in turn, drives technological innovation and advancement, ultimately driving economic development.
Percentage of the original language classes(%)	
Cyber Lectures Preview	

Syllabus

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
1	Course 1: Course Introduction		강의,	
2	Course 2: Photoelectric Phenomenon and Optical Properties		강의,	
3	Course 3: Photoelectric Phenomenon and Optical Properties		강의,	
4	Course 4: Physical Basis of Optoelectronic Devices		강의,	
5	Course 5: Physical Basis of Optoelectronic Devices		강의,	
6	Course 6: Solar Cells		강의,	
7	Course 7: Midterm Exam		문제해결 학습(BPL),	
8	Course 8: Solar Cells		강의,	
9	Course 9: Photodetectors		강의,	
10	Course 10: Photodetectors		강의,	
11	Course 11: Photocoupled Devices		강의,	
12	Course 12: Photocoupled Devices		강의,	
13	Course 13: Light Emitting Diodes		강의,	
14	Course 14: Light Emitting Diodes		강의,	
15	Course 15: Final Exam		문제해결 학습(BPL),	

Methods of Grading

sequence	Description	Percentage	Details
1	Mid-tem Exam	30%	
2	Final-exam	30%	
3	Pop Quizzes	0%	
4	Assignments	20%	
5	Reports	0%	
6	Presentations & Discussions	0%	
7	Attendance	20%	
8		0%	
9	Others	0%	
All		100%	

Core of Value

핵심가치	전공역량	역량정의	역량구분	값(%)
혁신 (Discovery)	창의적문제해결 (Creative problem-solving)	주어진 상황과 문제를 창의적으로 해결할 수 있는 능력	부역량	20%
혁신 (Discovery)	도전 (Challenging)	전공 지식을 새로운 분야와 융합하고 아우를 수 있는 능력		0%
혁신 (Discovery)	지식융합 (Knowledge convergence)	새로운 분야를 개척하거나 도전적으로 임할 수 있는 능력		15%
헌신 (Dedication)	세계시민 (Universal value)	세계 공동체 구성원으로 전공자로서 국제적 이슈에 대응할 수 있는 능력		10%
헌신 (Dedication)	상호협력 (Cooperation)	공동의 목적 달성을 위해 타인과 상호협력을 할 수 있는 능력		0%
헌신 (Dedication)	공동체 (Sense of community)	공동체의 구성원으로서 필요한 태도와 윤리의식을 가질 수 있는 능력		0%
능동 (self-Determination)	자기주도 (Self-Managing)	주어진 상황과 문제를 주도적이고 능동적으로 해결할 수 있는 능력		0%
능동 (self-Determination)	지식활용 (Knowledge application)	주어진 상황과 문제에 대해 논리적으로 파악하고 분석할 수 있는 능력	부역량	25%

핵심가치	전공역량	역량정의	역량구분	값(%)
능동 (self-Determination)	논리적사고 (Logical thinking)	전공관련 지식을 필요에 따라 다양하게 적용하고 활용할 수 있는 능력	주역량	30%
능동 (self-Determination)	의사소통 (Articulation)	대화를 통해 다양한 의견을 조율하고 합의를 이끌어 낼 수 있는 능력		0%

Textbook(s) & References

Description	Title	Author	Publisher
Required Textbook	Electronic Properties of Materials	Rolf E. Hummel	Springer Verlag
Required Textbook	Semiconductor Optoelectronic Devices	Pallab Bhattacharya	Prentice Hall

Memo

Thank you