

Syllabus [2025Year 2 Term]

Course Information

Course Title	Fundamental of Material Engineering	Credits	3
Course Code	543110-2	Required/Elective (For Undergraduate Courses)	Selective majors
Department or Major	Semiconductor Convergence Engineering	Language	English
Methods of Teaching		Lecture Room	화1,2,3/ 목1,2,3(3공104)
Time Allotment	Lecture(3) Experiments(0) Trainging & Practice(0) Performance(0) Designing & Planning(0)	Cyber Lectures	
Course Type	offline		
Cyber Lectures Preview			

Lecturer

Lecturer	Name	Yongjin Shin	Rank	Assistant Professor	Final Academic Degree	공학박사
	Department & college	Semiconductor Convergence Engineering		Office	College of Engineering – Building 2 505	
	Office Phone Number	—		e-mail	yongjin.shin@dankook.ac.kr	
	Field of Interest					

Course Summary

Course Description	<p>For the past several decades, the semiconductor industry has successfully followed Moore's Law, steadily scaling down transistors, which has significantly contributed to improving device performance and integration density.</p> <p>However, as semiconductor device scaling has entered the nanometer regime, the industry faces increasing challenges in physically implementing actual feature sizes. Consequently, industrial attention has shifted toward discussions about materials used in devices. In response to this trend, the semiconductor engineering field is making efforts to overcome the physical and technological limitations of materials through advances in process equipment and the development of innovative device structures. Additionally, alongside innovations in processes, equipment, and device structures, ongoing efforts are being made to find breakthroughs using novel materials.</p>
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	This course aims to provide an understanding of materials that are becoming increasingly important from the perspective of electronic engineering students.
Description Related Courses	Solid State Electronic Material Semiconductor device engineering Semiconductor process
Course Goals	Study the basic theories of the physical/chemical properties of various electronic materials (semiconductor materials, electrode materials, insulation materials, etc.) required to fabricate semiconductor devices, and cultivate material design capabilities that can be applied to electronic devices.
Projected Results	You can learn theories about the physical/chemical properties of various electronic materials and cultivate capabilities that can be applied to semiconductor device processes.
Percentage of the original language classes(%)	100%
Cyber Lectures Preview	

Syllabus

Times	Lecture Topic	Lecture Goals	Lecture Methods	Assignments
1	Course introduction		강의,	
2	Crystal structure 1		강의,	
3	Crystal structure 2		강의,	
4	Defects in solids		강의,	
5	Mechanical properties 1		강의,	
6	Mechanical properties 2		강의,	
7	Phase diagram		강의,	
8	Midterm		강의,	
9	Ceramics, Polymers and Composite materials		강의,	
10	Electrical properties 1		강의,	
11	Electrical properties 2		강의,	
12	Magnetic properties		강의,	
13	Thermal properties		강의,	
14	Optical properties		강의,	
15	Final exam		강의,	

Methods of Grading

sequence	Description	Percentage	Details
1	Mid-tem Exam	40%	
2	Final-exam	45%	
3	Pop Quizzes	5%	
4	Assignments	0%	
5	Reports	0%	
6	Presentations & Discussions	0%	
7	Attendance	10%	
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	부역량	30%
헌신 (Dedication)	세계시민 (Universal value)	세계 공동체 구성원으로 전공자로서 국제적 이슈에 대응할 수 있는 능력		0%
헌신 (Dedication)	상호협력 (Cooperation)	공동의 목적 달성을 위해 타인과 상호협력할 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	주역량	50%

핵심가치	전공역량	역량정의	역량구분	값(%)
능동 (self-Determination)	논리적사고 (Logical thinking)	전공관련 지식을 필요에 따라 다양하게 적용하고 활용할 수 있는 능력		0%
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	Materials Science and Engineering	William D. Callister etc.	WILEY

Memo

N/A