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# 2021 UNIST UNDERGRADUATE COURSE CATALOG

# 2021 UNIST ACADEMIC CALENDAR

Year	Month	Date	Schedules
2021 Spring Semester	3	1(Mon)	Holiday – Samiljeol(Independence Movement Day) 2021 Spring Semester Begins
		2(Tue)	2021 Spring semester classes begin
		2(Tue) ~ 5(Fri)	Course Changes and confirmation, Spring Application for graduation & early graduation
		26(Fri)	End of first quarter of the semester, Course Drop Deadline
	4	19(Mon) ~ 23(Fri)	Mid-term Exams
		23(Fri)	End of second quarter of the semester, Leave of Absence application deadline(General)
	5	5(Tue)	Holiday – Children's Day
		12(Wed) ~ 14(Fri)	Application for return from absence(Summer Session)
		19(Wed)	Holiday – Buddha's birthday
		21(Fri)	End of third quarter of the semester [G]Deadline for Thesis Committee Nomination
		24(Mon) ~ 28(Fri)	[UG] Major application & change period
		26(Wed) ~ 27(Thu)	[UG/G]Course Registration for the summer session
	6	6(Sun)	Holiday – Memorial Day
		14(Mon) ~ 18(Fri)	Final Exams
		18(Fri)	End of spring semester
		19(Sat) ~ 8.29(Sun)	Summer Vacation
		21(Mon) ~ 7.30(Fri)	Summer Session
	7	5(Mon)	Confirmation of Spring 2021 Grading
		12(Mon) ~ 23(Fri)	Application for 2021 Fall Leave of absence/return(1st) [G]Application for Program Change
	8	5(Thu) ~ 6(Fri)	[UG/G] Course Registration for fall semester
		9(Mon)	Confirmation of Summer 2021 Grading
		15(Sun)	Holiday – National Liberation Day
		9(Mon) ~ 20(Fri)	Application for 2021 Fall Leave of absence/return(2nd)
		20(Fri)	Conferral of degrees(2021–1st)
		24(Tue) ~ 26(Thu)	Tuition fee payment(2021 Fall)

Year	Month	Date	Schedules
2021 Fall Semester	8	30(Mon)	2021 Fall semester begins 2021 Fall semester classes begin
		30(Mon) ~ 9.3(Fri)	Course changes and confirmation Fall Application for graduation & early graduation
	9	24(Fri)	End of first quarter of the semester, Course Drop Deadline
		20(Mon)~ 22(Wed)	Holiday – Chuseok(Korean Thanksgiving Day)
		28(Mon)	Holiday – UNIST Foundation Day
	10	3(Sun)	Holiday – National Foundation Day
		9(Wed)	Holiday – Hangul Proclamation Day
		18(Mon) ~ 22(Fri)	Mid-term exams
		22(Fri)	End of second quarter of the semester Leave of Absence application deadline(General)
	11	10(Wed) ~ 12(Fri)	Application for return from absence(Summer Session)
		19(Fri)	End of third quarter of the semester [G]Deadline for Thesis Committee Nomination
		22(Mon) ~ 26(Tue)	[UG] Major application & change period
		24(Wed) ~ 25(Thu)	[UG/G] Course Registration for the winter session
	12	13(Mon) ~ 17(Fri)	Final Exams
		17(Fri)	End of fall semester
		18(Sat)~2022.2.27(Sun)	Winter Vacation
		20(Mon) ~ 1.28(Fri)	Winter Session
		25(Sat)	Holiday – Christmas
2022	1	1(Sat)	Holiday – New Year's Day
		3(Mon)	Confirmation of Fall 2021 Grading
		3(Mon) ~ 14(Fri)	Application for Leave of absence/return(1st) (Spring 2022) [G]Application for Program Change
		27(Thur) ~ 28(Fri)	[UG/G] Course Registration for spring semester
	2	1.31(Mon)~2.2(Wed)	Holiday – Lunar New Year's Day
		7(Mon)	Due date for winter session grading
		7(Mon) ~ 18(Fri)	Application for 2022 Leave of absence/return(2nd)
		17(Thu)	Conferral of degrees(Fall 2021), Commencement Ceremony
		22(Tue) ~ 24(Thu)	Tuition fee payment(Spring 2022)

※ Schedules above are subject to change according to the school policies.



# **Undergraduate Program**

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# Definitions [용어정의]

Terms 용어	Definition 정의
Curriculum Year [교육과정 적용연도]	<p>In principle, students should refer to their entrance year curriculum.      However, the new curriculum can also be counted accordingly.      원칙적으로, 본인의 입학년도 교육과정을 따라야 하나,      이후 교육과정 또한 참고하여 이수할 수 있으며 해당 교육과정상 이수구분에 따라 인정받을 수 있습니다.</p>
Basic [기초]	<p>Formerly 'Fundamental' courses.      Each field has [Required] basic courses and [Elective] courses.      Basic [Elective] requirements are designated by each department(school).      구) 계열기초 교과. 각 계열별 [기초필수] 교과와 [기초선택] 교과가 있습니다.      [기초선택] 교과는 각 학과(부)별 요건이 별도로 지정되어 있습니다.</p>
Liberal Arts [교양]	<p>In Liberal Arts, there are ① English ② Language ③ Liberal Arts courses,      and each section has separate requirements.      교양 영역에는 ① 영어 ② 언어(제2외국어) ③ Liberal Arts (교양) 세가지 분야가 있고,      각 분야별 별도의 학점이 설정되어 있습니다.</p>
Major [전공] Double Major [복수전공] Minor [부전공]	<p>All students must have one major from sophomore.      However, students can have double major and minor and they are optional.      모든 학생은 2학년부터 주전공을 필수적으로 선택하게 되어 있고, 복수전공과 부전공은 선택사항입니다.</p>
Prerequisite [선이수] Identical [동일교과]	<p>Prerequisite: If course A has prerequisite course B,      course B should be completed before taking course A.      Identical: If course C and course D is identical, taking course C will be regarded as taking course D      선이수교과: A 교과의 선이수 교과가 B인 경우,      B 교과를 이수하기 위해서는 A 교과를 이수 완료하여야 합니다.      동일교과: C 교과와 D 교과가 동일교과인 경우, C 교과를 이수하면 D 교과를 이수한 것으로 간주됩니다.</p>
Minimum credits 최소 학점	<p>All credit requirements in each category is minimum credits.      Each department(school) has own graduation requirements so you should carefully confirm your      major graduation requirements.      각 영역별로 학교에서 정한 최소 학점이 설정되어 있고,      각 학과(부)에서 영역별로 졸업요건을 별도로 설정했습니다.      반드시 각 학과(부)별 졸업요건을 확인해주세요.</p>
Free Elective [자유선택]	<p>All courses that are not counted in [Basic], [Liberal Arts], [Major/Double Major/Minor]      will be counted in [Free elective] courses.      [기초], [교양], [전공/복수전공/부전공]으로 인정되지 않은 학점은 [자유선택]으로 인정됩니다.</p>
Semester [개설학기]	<p>Semester offered in each page is plan of each department(school).      Course opening semester is subject to change according to various circumstances.      각 페이지에 있는 개설학기는 각 학과(부)의 개설 계획입니다.      개설학기는 여러 상황에 따라 변경될 수 있습니다.</p>

# Instructions [교육과정 설명서]

## 1. Graduation Requirement [졸업 이수요건]

Category	Credits	Remarks	Subtotal
		비고	소계
Basic 기초	Required 필수	17	Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)
	Elective 선택[학과 자정]	13	Complete basic elective courses at least 13 credits including Applied Linear Algebra(3) and Differential Equations(3)
Major 전공	Required 필수	27	Refer to Required course list below
	Elective 선택	21	Refer to Elective course list below
	Internship 인턴십	3	Internship (Choose one among Research, Industrial, Venture Creation, Co-op)
Free Elective 자유선택	19	All courses acceptable	At least 19 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 01. Graduation Requirement [졸업 이수요건]

All students must check each department(school) graduation requirements. You must complete at least minimum credits for each category. Also see the overall graduation requirements on next page.

모든 학생은 졸업을 위하여 각 학과(부)별 졸업 이수요건을 확인하여야 합니다. 각 영역별 최소학점 이상을 이수하여야 합니다. 다음 페이지에 있는 계열별 졸업 요건도 반드시 함께 확인하시기 바랍니다.

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 credits	6 credits	-
1	MTH112	Calculus II(3)	○		
2	PHY103	General Physics I(3)	○		
3	CHM102	General Chemistry II(3)	○		
4	PHY108	General Physics Lab. II(1)	○		
5	CHM106	General Chemistry Lab. II(1)	○		
6	MTH201	Differential Equations (3)	●	●	
7	MTH203	Applied Linear Algebra (3)	●	●	
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II(3)	○		
12	ITP112	Discrete Mathematics (3)	○		
13	ITP111	Probability & Random Process (3)	○		
14	UNI101	Understanding Major Mechanical Engineering and Future	○		

●: Required ○: Elective ( ): Recommended, ( ) credits

## 02. Basic Requirement [기초 이수요건]

Each department(school) has basic course requirements for major/double major/minor. Major requirements will be counted as 'Basic elective'. If there are double major and minor requirements, completed credits will be counted as free elective.

각 학과(부)에는 전공/복수전공/부전공 기초 교과 이수 요건이 있습니다. 각 전공(Major) 이수요건은 기초선택 요건으로 인정되며, 복수전공/부전공에 필수 요건이 있는 학과(부)의 경우 해당 교과 이수시 해당 학점은 자유선택으로 인정됩니다.

## 3. Curriculum [기계공학과 교육과정]

### ► Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Mechanical Engineering	27	21	48	18	18	36	9	9	18

\*R: Required, E: Elective

## 03. Credit Requirements [전공/복수전공/부전공 이수학점]

Major, Double Major, Minor has [Required] and [Elective] courses. You must complete certain credits in Required and Elective courses.

전공/복수전공/부전공에는 [필수교과]와 [선택교과]가 있습니다. 각 필수교과, 선택교과 중에서 일정 학점 이상을 이수하여야 합니다.

### ► Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remarks	Semester
MSE202	Introduction to Materials Science and Engineering 재료공학개론	○	○	○	3-3-0		1
MSE203	Physical Chemistry I: Thermodynamics 재료물리학 I: 열역학	○	○	○	3-3-0		1
MSE230	Introduction to Crystallography 정성학개론	○	○	○	3-3-0	[PRE] MSE202	2
MSE390	Introduction to Computational Materials Science 전산재료과학개론	○	○		3-3-0		2
MSE300	Materials Lab 재료실험	○	○		3-1-4		2
MSE312	Phase Transitions in Materials 재료상변태	○	○	○	3-3-0		1
MSE354	Introduction to Semiconductor 반도체개론	○	○		3-3-0		1
Total		21	21	12			

\*Courses that are not required for Minor can be counted as Elective course

## 04. Course List (교과목록)

[Required] and [Elective] courses are listed by each department(school). Also, read carefully of the captions written below the list. The ○ notation in the list means a course that is only counted by a particular major type. Ex) If there are no circles on [Minor] courses, those courses will not be counted as minor credits. It will be counted as free elective courses.

각 학과(부)별로 [필수교과], [선택교과]가 표기되어 있습니다. 과목 목록 하단에 주석이 있는 경우 자세히 읽어보시기 바랍니다. 목록에 있는 ○ 표기는 특정 전공 유형에게만 인정되는 교과를 의미합니다. 예를 들어, 부전공에 ○ 표기가 안되어 있으면 부전공 학점으로 인정받을 수 없고 자유선택으로만 인정 가능합니다.

## 4. Curriculum Change [교육과정 변경사항]

Major	2020	→	2021
PHY	PHY418 Polymer and Soft Matter Physics 고분자 및 연성질물리학		PHY418 Thermal and Statistical Physics II : Soft Matter Physics 열 및 통계물리학 II: 연성질물리학 (과목명 변경: Course Title Changed)
	PHY202 Classical Mechanics II 고전기학 II (1TR: Required, 2TR: Elective)		PHY202 Classical Mechanics II 고전기학 II (Elective, 전공 선택과목으로 변경)
	PHY204 Electromagnetism II 전자기학 II (1TR: Required, 2TR: Elective)		PHY204 Electromagnetism II 전자기학 II (Elective, 전공 선택과목으로 변경)
	PHY302 Quantum Physics II 양자물리학 II (1TR: Required, 2TR: Elective)		PHY302 Quantum Physics II 양자물리학 II (Elective, 전공 선택과목으로 변경)
	PHY307 Physics Lab II 물리학실험 II (1TR: Required, 2TR: Elective)		PHY307 Physics Lab II 물리학실험 II (Elective, 전공 선택과목으로 변경)

## 05. Curriculum Change [교육과정 변경사항]

Changes from 2020 curriculum to 2021 curriculum will be listed.

2020학년도 교육과정 대비 2021학년도 변경사항이 기재되어 있습니다.

## 5. Curriculum Map [교육과정 이수 체계도]

Freshman		Sophomore		Junior		Senior	
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Required Basic Courses	Elective Basic Courses	Classical Mechanics I	Classical Mechanics II	Quantum Physics I	Quantum Physics II	Thermal and Statistical Physics II	Fluid Physics
General Physics II	Electro-magnetism I	Computational Physics	Thermal and Statistical Physics I	Introduction to Plasma Physics	Nuclear and Elementary Particle Physics		
General Physics Lab II	Modern Physics	Mathematical Physics	Physics Lab II	Solid State Physics I	Biological Physics	Introduction to Beam Physics	
Calculus II	Applied Linear Algebra	Physics Lab I	Astrophysics	Astrophysics : Stars and Blackholes	Solid Physics II : Galaxies and the Universe	Introduction to Theoretical Physics	

## 06. Curriculum Map [교육과정 이수 체계도]

Recommended curriculum path is suggested by each department(school)

각 학과(부)별 권장 이수 체계도가 각 학과(부)별로 기재되어 있습니다.

# Graduation Requirements

## ■ Engineering Field (이공계열)

※ Below credits are minimum requirements for each category (각 영역별로 기재된 학점은 최소 총학점임)

Category	Course List		Credits	Total (Credits)
Basic 기초	Required 기초필수	Calculus I	3	17
		General Physics I	3	
		General Chemistry I	3	
		General Biology	3	
		Introduction to AI Programming I	3	
		General Physics Lab I	1	
		General Chemistry Lab I	1	
Liberal Arts 교양	Language 언어*	Korean Students	Chinese Foundation	Choose 1 (2 credits)
			Chinese Forward	
			Spanish Foundation	
			Korean Writing	
		International Students	Korean Foundation	Choose 1 (2 credits)
			Korean for Everyday	
	English 영어	Lev.1	English Camp	At least 24
			English Listening & Speaking (Intermediate)	
			English Reading & Writing	
		Lev.2	English Listening & Speaking (Intermediate)	
			English Reading & Writing	
		Lev.3	English Listening & Speaking (Advanced)	
			English Reading & Writing	
		Lev.4	Exemption	
Major 전공	Take 18 credits in Liberal Arts Category			18
	Major [전공]			At least 48
*Refer to each department(school) requirements	Internship (Choose one among Research, Industrial, Venture Creation, Co-op)			3
	Double Major [복수전공] (Optional)			At least 36
	Minor [부전공] (Optional)			At least 18
	All courses acceptable			Follow Each department(school) requirements
Free Elective 자유선택	UNIST Leadership Program			6AU

Total 124 credits / 6AU

\*Language: Students can fulfill requirements taking French/Japanese/German/Russian courses through credit exchange

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## ■ Business Administration Field (경영계열)

※ Below credits are minimum requirements for each category (각 영역별로 기재된 학점은 최소 총학점임)

Category	Course List			Credits	Total (Credits)			
Basic 기초	Required 기초필수	Calculus I		3	9			
		Introduction to AI Programming I		3				
		General Physics I		Choose 1				
		General Chemistry I						
		General Biology						
	Elective 기초선택	Follow each department(school) requirements			At least 19			
	Language 언어*	Korean Students	Chinese Foundation	Choose 1 (2 credits)	2			
			Chinese Forward					
			Spanish Foundation					
			Korean Writing					
Liberal Arts 교양		International Students	Korean Foundation	Choose 1 (2 credits)	At least 24			
			Korean for Everyday					
English 영어	Lev.1	English Camp	4					
		English Listening & Speaking (Intermediate)						
		English Reading & Writing						
	Lev.2	English Listening & Speaking (Intermediate)						
		English Reading & Writing						
	Lev.3	English Listening & Speaking (Advanced)						
		English Reading & Writing						
	Lev.4	Exemption						
	Liberal Arts 교양	Take 18 credits in Liberal Arts Category			18			
Major 전공  *Refer to each department(school) requirements	Major [전공]			At least 48	At least 51			
	Internship (Choose one among Research, Industrial, Venture Creation, Co-op)			3				
	Double Major [복수전공] (Optional)			At least 36	-			
	Minor [부전공] (Optional)			At least 18				
Free Elective 자유선택	All courses acceptable			Follow Each department(school) requirements				
Leadership 리더십프로그램	UNIST Leadership Program			6AU				

Total 124 credits / 6AU

\*Language: Students can fulfill requirements taking French/Japanese/German/Russian courses through credit exchange

## ■ Major / Double Major / Minor credit requirements of each department(school)

[학과(부)별 전공 / 복수전공 / 부전공 전공 요구 학점]

College 단과대학	Department(School) 학과(부)	Major 전공			Double Major 복수전공			Minor 부전공		
		R	E	Total	R	E	Total	R	E	Total
College of Engineering 공과대학	Department of Mechanical Engineering 기계공학과	27	21	48	18	18	36	9	9	18
	Department of Urban and Environmental Engineering 도시환경공학과	15	39	54	12	24	36	6	12	18
	Department of Materials Science and Engineering 신소재공학과	21	30	51	21	18	39	12	6	18
	School of Energy and Chemical Engineering 에너지화학공학과	33	18	51	33	6	39	18	0	18
	Department of Nuclear Engineering 원자력공학과	33	21	54	15	21	36	3	15	18
College of Info-Bio Convergence Engineering 정보바이오 융합대학	Department of Design 디자인학과	30	18	48	30	6	36	12	6	18
	Department of Biomedical Engineering 바이오메디컬공학과	21	33	54	15	24	39	12	6	18
	Department of Industrial Engineering 산업공학과	24	24	48	15	21	36	9	9	18
	Department of Biological Sciences 생명과학과	32	22	54	14	22	36	11	7	18
	Department of Electrical Engineering 전기전자공학과	21	27	48	18	18	36	18	0	18
	Department of Computer Science and Engineering 컴퓨터공학과	24	24	48	18	21	39	15	15	30
College of Natural Sciences 자연과학대학	Department of Physics 물리학과	24	30	54	18	18	36	12	6	18
	Department of Mathematical Sciences 수리과학과	30	24	54	15	21	36	12	6	18
	Department of Chemistry 화학과	30	24	54	18	18	36	12	6	18
-	School of Business Administration 경영과학부	21	27	48	21	15	36	12	6	18

※ R: Required (필수) / E: Elective (선택)

※ Double Major and Minor are optional. Students can apply for Double Major and Minor in their 3<sup>rd</sup> semester.

복수전공, 부전공은 선택사항이며 3학기에 신청 가능.

## ■ Graduation Requirements of each department(school) [학과(부)별 졸업과제]

College 단과대학	Department(School) 학과(부)	Requirements
College of Engineering 공과대학	Department of Mechanical Engineering 기계공학과	MEN490 Thesis Study [졸업연구] (3 credits)
	Department of Urban and Environmental Engineering 도시환경공학과	UEE490 Graduate Thesis [졸업논문] (0 credits)
	Department of Materials Science and Engineering 신소재공학과	Complete at least 3 credits of Research Internship or Coop internship and submit internship report
	School of Energy and Chemical Engineering 에너지화학공학과	ECHE490 Undergraduate Thesis Research [학사졸업논문연구] (3 credits)
	Department of Nuclear Engineering 원자력공학과	NE490 Graduate Thesis [졸업논문] (0 credits)
College of Info-Bio Convergence Engineering 정보바이오 융합대학	Department of Design 디자인학과	Complete course: DES431 Creative Design 1 [창의디자인1] (3 credits)
	Department of Biomedical Engineering 바이오메디컬공학과	Complete course: BME490 Capstone Design [캡스톤디자인] (3 credits)
	Department of Industrial Engineering 산업공학과	Complete course: IE450 Project Lab [프로젝트랩] (3 credits)
	Department of Biological Sciences 생명과학과	BIO490 Thesis Research [졸업논문] (3 credits)
	Department of Electrical Engineering 전기전자공학과	EEE490 Undergraduate Research [졸업연구] (3 credits)
	Department of Computer Science and Engineering 컴퓨터공학과	CSE401 Research in Computer Science and Engineering [졸업연구] (3 credits)
College of Natural Sciences 자연과학대학	Department of Physics 물리학과	PHY490 Graduate Thesis [졸업논문] (0 credits)
	Department of Mathematical Sciences 수리과학과	MTH490 Graduate Thesis [졸업논문] (0 credits)
	Department of Chemistry 화학과	CHM400 Thesis [졸업논문] (3 credits)
-	School of Business Administration 경영과학부	Complete course: MGT499 Strategic Management [경영전략] (3 credits)

## ■ English Qualification Test [공인영어성적]

- All students must submit English Qualification Test score before graduation (At least once)

Type	TOEFL (iBT)	TOEIC	NEW TEPS	IELTS	TOEIC S&W	OPIC	G-TELP (Lev.2)	G-TELP (Lev.3)
Score (Minimum)	80	800	350	6.5	250(09~13) 270(14~)	IH	67	89

## ■ Remarks for students entered before 2021 [2021학년도 이전 입학생 참고 안내사항]

※ Students entered before 2020 should follow their entrance year curriculum(Students affiliated in new academic organization installed after 2020 Fall should refer to 2021 curriculum). However, students can take newly opened course offered after 2021, and for related information, refer to above department(school)'s curriculum. \*When registering courses, conditions(Prerequisite, Identical course, etc.) for each courses will be applied based on the curriculum of the year.

[2020학년도 이전 입학생들은 본인 입학년도의 교육과정을 따르는 것을 원칙으로함(2020년 2학기 개편된 학사조직에 소속된 학생의 경우 2021학년도 교육과정 참고). 단, 2021학년도 이후에 개설된 교과를 추가로 이수할 수 있으며, 관련 사항은 상기 표를 참고하여 각 학과(부)별 교육과정 상 교과 참고.  
\*수강신청시 선이수/동일과목등의 과목별 조건은 수강신청 당해학년도 교육과정을 기준으로 적용됨]

School 학부	Track 트랙	Refer to. (2021학년도 기준) 참고 학과
Mechanical, Aerospace and Nuclear Engineering 기계항공및원자력공학부	Mechanical and Aerospace Engineering (MAE) 기계항공공학 트랙	Department of Mechanical Engineering 기계공학과
	System Design and Control Engineering (SDC) 제어설계공학 트랙	
	Nuclear Science and Engineering (NSE) 원자력과학공학 트랙	Department of Nuclear Engineering 원자력공학과
Urban and Environmental Engineering 도시환경공학부	Environmental Science and Engineering (ESE) 환경과학공학 트랙	Department of Urban and Environmental Engineering 도시환경공학과
	Urban Infrastructure Engineering (UIE) 도시건설공학 트랙	
	Disaster Management Engineering (DME) 재난관리공학 트랙	
Design and Human Engineering 디자인및인간공학부	Industrial Design (ID) 산업디자인 트랙	Department of Design 디자인학과
	Human Factors Engineering (HFE) 인간공학 트랙	
Life Sciences 생명과학부	Biomedical Engineering (BME) 생명공학 트랙	Department of Biomedical Sciences 바이오메디컬공학과
	Biological Sciences (BIO) 생명과학 트랙	
Materials Science and Engineering 신소재공학부	Advanced Materials Science (AMS) 신소재과학 트랙	Department of Materials Science and Engineering 신소재공학과
	Semiconductor Materials Engineering(SE) 반도체재료공학 트랙	
Energy and Chemical Engineering 에너지및화학공학부	Energy Engineering (ENE) 에너지공학 트랙	School of Energy and Chemical Engineering 에너지화학공학과
	Chemical Engineering (ACE) 화학공학 트랙	
Electrical and Computer Engineering 전기전자컴퓨터공학부	Electrical Engineering (EE) 전기전자공학 트랙	Department of Electrical Engineering 전기전자공학과
	Computer Science & Engineering (CSE) 컴퓨터공학 트랙	
Natural Science 자연과학부	Physics (PHY) 물리학 트랙	Department of Physics 물리학과
	Chemistry (CHEM) 화학 트랙	Department of Chemistry 화학과
	Mathematical Sciences (MTH) 수리과학 트랙	Department of Mathematical Sciences 수리과학과
Management Engineering 경영공학부	Management Engineering (MGE) 경영공학 트랙	Department of Industrial Engineering 산업공학과
Business Administration 경영학부	Management (MGT) 경영학 트랙	School of Business Administration 경영과학부
	Finance & Accounting (FIA) 재무회계학 트랙	
	Entrepreneurship (EPS) 벤처경영 트랙	

## Basic Requirements

# Basic Courses [기초]

Category			Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
-	ENG	BUS					
Required (필수)	O	O	MTH111	Calculus I 미적분학 I	3-3-1		1
	O	O	ITP107	Introduction to AI Programming I 기초 인공지능 프로그래밍 I	3-2-2		1,2
	O	O	PHY101 (PHY102)	General Physics I (General Physics I H) 일반물리학 I (고급일반물리학 I)	3-3-0	O is a honor course	1
	O		CHM101	General Chemistry I 일반화학 I	3-3-0		1
	O	O	BIO101 (BIO103)	General Biology (Advanced General Biology) 일반생물 (고급일반생물학)	3-3-0	O is a honor course	1,2
	O		CHM105	General Chemistry Lab I 일반화학실험 I	1-0-2		1
	O	X	PHY107	General Physics Lab I 일반물리학실험 I	1-0-2		1
Elective (선택)		MTH112		Calculus II 미적분학 II	3-3-1		2
		MTH201		Differential Equations 미분방정식	3-3-0	[PRE] MTH111	1,2
		MTH203		Applied Linear Algebra 응용선형대수	3-3-0		1,2
		MTH211		Statistics 통계학	3-3-0		1,2
		PHY103 (PHY104)		General Physics II (General Physics II H) 일반물리학 II (고급일반물리학 II)	3-3-0	O is a honor course	2
		PHY108		General Physics Lab II 일반물리학실험 II	1-0-2		2
		CHM102		General Chemistry II 일반화학 II	3-3-0		2
		CHM106		General Chemistry Lab II 일반화학실험 II	1-0-2	[PRE] CHM101, CHM105	2
		ITP117		Introduction to AI Programming II 기초 인공지능 프로그래밍 II	3-2-2		1,2
		ITP111		Probability and Random Processes 확률과 랜덤 프로세스	3-3-0		1,2
		ITP112		Discrete Mathematics 이산수학	3-3-0		2
		MGT102		Entrepreneurship 기업가정신	3-3-0		1,2
		IE101		Introduction to Data Science 데이터사이언스 개론	3-3-0		2
		MGT106		Economics 경제원론	3-3-0	Only for Business Administration Field	1
Understanding Major 전공의 이해 교과		UNI101		Mechanical Engineering and Future 기계공학과 미래	1-1-0	Mechanical Engineering 기계공학과	2
		UNI102		What you may (not) want to know about cities and environment 알쓸도한: 알아두면 좋데 있는 도시와 환경이야기	1-1-0	Urban and Environmental Engineering 도시환경공학과	2
		UNI103		Trend in Materials Science and Engineering	1-1-0	Materials Science and Engineering 신소재공학과	2

Category			Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
-	ENG	BUS					
Understanding Major <sup>1)</sup> 전공의 이해 교과	UNI104	Trends in Energy & Chemical Engineering 에너지화학공학소개	1-1-0	Energy and Chemical Engineering 에너지화학공학과	2		
	UNI105	The future of Nuclear Engineering 원자력의 미래	1-1-0	Nuclear Engineering 원자력공학과	2		
	UNI106	What is Design? 디자인이라?	1-1-0	Design 디자인학과	2		
	UNI107	BME to change the world 세상을 바꾸는 바이오메디컬공학	1-1-0	Biomedical Engineering 바이오메디컬공학과	2		
	UNI108	Industrial Engineering Relay Seminar 산업공학 릴레이 세미나	1-1-0	Industrial Engineering 산업공학과	2		
	UNI109	Current Topics in Biological Sciences 현대생명과학동향	1-1-0	Biological Sciences 생명과학과	2		
	UNI110	Introduction to Modern Electrical Engineering 최신전기전자공학소개	1-1-0	Electrical Engineering 전기전자공학과	1		
	UNI111	Introduction to Computer Science and Engineering 컴퓨터공학 소개	1-1-0	Computer Science and Engineering 컴퓨터공학과	2		
	UNI112	Physics & Innovative Technology 물리학과 첨단기술	1-1-0	Physics 물리학과	2		
	UNI113	Introduction to Modern Mathematics 현대수학입문	1-1-0	Mathematical Sciences 수리과학과	2		
	UNI114	Why Chemistry? 왜 화학인가?	1-1-0	Chemistry 화학과	2		
	UNI115	Principles of management 경영원론	1-1-0	Business Administration 경영과학부	2		

※ ENG: Engineering Field, BUS: Business Administration Field

※ MGT106 Economics is not basic elective course for engineering field students, but when students take the course it can be counted as free elective.

1) There are no restrictions in taking understanding major courses, but for graduation requirement, only 2 credits will be counted.

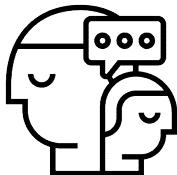
## Curriculum Change

2020	2021	
MTH114 Advanced Calculus 고급미적분학	→	⟨Closed⟩
MGT102 Entrepreneurship & Big Data 기업가정신과 빅데이터		MGT102 Entrepreneurship 기업가정신
EE211 Probability and Random Processes 확률과 랜덤 프로세스 ⟨Formerly EE Major Course⟩		IE101 Introduction to Data Science 데이터사이언스개론
CSE232 Discrete Mathematics 이산수학 ⟨Formerly CSE Major Course⟩		ITP111 Probability and Random Processes 확률과 랜덤 프로세스 ⟨Basic Course⟩
		ITP112 Discrete Mathematics 이산수학 ⟨Basic Course⟩

\*Students who wish to retake MGT102 Entrepreneurship & Big Data(taken before 2021) can take either 'MGT102 Entrepreneurship' or 'IE101 Introduction to Data Science' (2021학년도 이전 이수한 MGT102 기업가정신과 빅데이터 재이수: MGT102 기업가정신 / IE101 데이터 사이언스개론 중 택1)

# School of Liberal Arts [인문학부]

## ■ School Introduction [학부소개]



With a view to realizing UNIST's vision of educating global leaders in science and technology who will contribute to the prosperity of humankind, the School of Liberal Arts (SLA) is committed to nurturing the creativity, critical thinking and communication skills of students. The SLA offers undergraduate courses in humanities, social sciences, visual arts, and musical instrument performances including piano and violin. The SLA faculty and staff members are dedicated to providing quality teaching and cultivating the various talents of individual students. In an effort to assure UNIST students of the best education, SLA will continue to diversify its curriculum and extend collaboration with other departments and institutions.

## ■ Liberal Arts Curriculum [교양 교육과정]

Category	Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
English	ENG110	English Listening&Speaking(Intermediate) 영어 듣기&말하기 (중급)	2-1-2	Take 2 according to your level	1,2
	ENG111	English Listening&Speaking(Advanced) 영어 듣기&말하기 (상급)	2-1-2		1,2
	ENG112	English Reading&Writing 영어 읽기&쓰기	2-1-2		1,2
Language	LNG201	Chinese Foundation 중국어 기초	2-1-2	Only for Korean Students *LNG100 will be offered in Korean	1,2
	LNG202	Chinese Forward 중국어 심화	2-1-2		1,2
	LNG205	Spanish Foundation 스페인어 기초	2-1-2		1,2
	LNG100	Korean Writing 한국어 글쓰기	2-1-2		1,2
	LNG203	Korean I 한국어 I	2-1-2	Only for International Students (Non-Korean Students)	1,2
	LNG204	Korean II 한국어 II	2-1-2		1,2
Liberal Arts	SLA101	Law and Social Life 법과 사회생활	3-3-0		1,2
	SLA111	Understanding Visual Arts 시각예술의 이해	3-2-1		1,2
	SLA121	Music and Creativity, Piano 음악과 창의성, 피아노	3-1-2		1,2
	SLA122	Music and Creativity, Strings 음악과 창의성, 현악	3-1-2		1,2
	SLA123	Contemporary Piano 컨템포러리 피아노	3-1-2		1,2
	SLA124	Understanding Western Music 서양음악의 이해	3-3-0		1,2
	SLA125	Violin Fundamentals 바이올린의 기초	3-1-2		1,2
	SLA126	Music Appreciation 음악의 이해	3-2-1		1,2
	SLA131	Literature and Creativity 문학과 창의성	3-3-0		1,2

Category	Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
Liberal Arts	SLA132	Drama 드라마	3-3-0		1,2
	SLA133	Literature and Science 문학과 과학	3-3-0		1,2
	SLA141	Media and Culture 미디어와 문화	3-3-0		1,2
	SLA151	History of Korean Civilization 한국문명사	3-3-0		1,2
	SLA152	Evolution of Civilization 문화의 발전	3-3-0		1,2
	SLA153	Foundations of East Asian Civilization 동아시아 문명의 기초	3-3-0		1,2
	SLA154	History of Modern East Asia 동아시아의 근현대사	3-3-0		1,2
	SLA161	Introduction to Philosophy 철학개론	3-3-0		1,2
	SLA171	Science of Human Behavior 인간행동의 과학	3-3-0		1,2
	SLA181	Discovering Anthropology 인류학의 발견	3-3-0		1,2
	SLA186	Understanding Politics 정치학의 이해	3-3-0		1,2
	SLA190	Introduction to Linguistics 언어학개론	3-3-0		1,2
	SLA201	Law and Technology 법과 과학기술	3-3-0		1,2
	SLA212	Visual Culture and Art 시각 문화와 예술	3-2-1		1,2
	SLA213	Themes of Contemporary Art 현대 미술의 테마	3-2-1		1,2
	SLA221	Advanced Piano 피아노 연주	3-1-2		1,2
	SLA222	Chamber Music 실내악	3-1-2		1,2
	SLA231	Korean Literature and Gender 한국문학과 젠더	3-3-0		1,2
	SLA232	Russian Novel 러시아소설	3-3-0		1,2
	SLA233	East Asian Others in Korean Literature 한국문학 속 동아시아	3-3-0		1,2
	SLA234	Contemporary Korean Fiction 한국현대소설	3-3-0		1,2
	SLA235	Introduction to Digital Humanities 디지털 인문학 입문	3-3-0		1,2
	SLA241	Effective Communication 효과적 커뮤니케이션	3-3-0		1,2
	SLA242	Media Technology and Human Values 미디어기술과 인간가치	3-3-0		1,2
	SLA243	Global Politics and Media 국제 정치와 미디어	3-3-0		1,2
	SLA251	History of Modern Korea 한국 근현대사	3-3-0		1,2
	SLA252	History of Contemporary World 현대 세계사	3-3-0		1,2

Category	Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
Liberal Arts	SLA253	History of Science 과학기술사	3-3-0		1,2
	SLA254	Understanding Korea 한국의 이해	3-3-0		1,2
	SLA255	Introduction to Science, Technology and Society 과학기술학(STS) 개론	3-3-0		1,2
	SLA256	U.S. History 미국사	3-3-0		1,2
	SLA257	History of International Relations 국제관계사	3-3-0		1,2
	SLA258	Economic Anthropology 경제 인류학	3-3-0		1,2
	SLA261	Critical Thinking 비판적 사고	3-3-0		1,2
	SLA262	Philosophy of Religion 종교철학	3-3-0		1,2
	SLA263	Fundamental Issues of Philosophy 철학의 근본문제	3-3-0		1,2
	SLA271	Cognitive Science 인지과학	3-3-0		1,2
	SLA281	Society and Culture 사회와 문화	3-3-0		1,2
	SLA282	Understanding Popular Culture 대중문화의 이해	3-3-0		1,2
	SLA283	Gender and Society 젠더와 사회	3-3-0		1,2
	SLA286	Science and Technology Policy 과학기술 정책	3-3-0		1,2
	SLA291	Globalization and Economy 세계화와 글로벌경제	3-3-0		1,2
	SLA292	Introduction to English Styles 영문체 개론	3-3-0		1,2
	SLA293	English Language & Culture 영어와 문화	3-3-0		1,2
	SLA294	English for Business 비즈니스 영어	3-3-0		1,2
	SLA295	English for Science and Technology 과학기술 영어	3-3-0		1,2
	SLA296	Critical Academic Literacy 학술영어 비판적 읽고 쓰기	3-3-0		1,2
	SLA297	English Language Information and Data 영어와 정보 데이터	3-3-0		1,2
	SLA298	Global English in Engineering Community 글로벌영어와 공학	3-3-0		1,2
	SLA310	Topics in Arts 예술 특강	3-3-0		1,2
	SLA311	Art, Community, Environment 예술, 공동체, 환경	3-2-1		1,2
	SLA320	Topics in Music 음악 특강	3-1-2		1,2
	SLA321	19th Century Piano Music 19세기 피아노 음악	3-1-2		1,2
	SLA322	Violin Seminar 바이올린 세미나	3-1-2		1,2

Category	Course Code	Course Title	Cred. -Lect. -Exp.	Remarks	Semester
Liberal Arts	SLA330	Topics in Literature 문학 특강	3-3-0		1,2
	SLA332	Dostoevsky and Tolstoy 도스토옙스키와톨스토이	3-3-0		1,2
	SLA333	AI and Storytelling AI와 스토리텔링	3-3-0		1,2
	SLA340	Topics in Communication Studies 커뮤니케이션특강	3-3-0		1,2
	SLA341	Computer Mediated Communication 컴퓨터매개커뮤니케이션	3-3-0		1,2
	SLA342	Personality, Self, and Communication: Intrapersonal Communication 자아커뮤니케이션	3-3-0		1,2
	SLA350	Topics in History 역사특강	3-3-0		1,2
	SLA351	History Through Film 영화를통한역사	3-3-0		1,2
	SLA360	Topics in Philosophy 철학특강	3-3-0		1,2
	SLA361	Metaphysical 형이상학	3-3-0		1,2
	SLA362	Ethics 윤리학	3-3-0		1,2
	SLA364	Logic 논리학	3-3-0		1,2
	SLA370	Topics in Psychology 심리학특강	3-3-0		1,2
	SLA380	Topics in Anthropology 인류학특강	3-3-0		1,2
	SLA381	Social Science Research Methods 사회과학연구방법론	3-3-0		1,2
	SLA382	AI and Society 인공지능(AI)과사회	3-3-0		1,2
	SLA384	Human Evolution 인류의진화	3-3-0		1,2
	SLA398	SLA Special Topics I SLA특강I	Variable		1,2
	SLA399	SLA Special Topics II SLA특강II	Variable		1,2
	SLA451	History, Technoscience, and the Public 공적영역과테크노사이언스	3-3-0		1,2
	SLA461	Philosophy of Science 과학철학	3-3-0		1,2
	SLA481	Risk Society and the 21st Century 21세기와위험사회	3-3-0		1,2
	SLA490	Writing in Academic Disciplines 전공영어쓰기	3-3-0		1,2
	SLA491	Technical Writing in English 영어논문작성법	3-3-0		1,2
<b>Total</b>			261		

\*Language: ① Students can fulfill requirements taking French/Japanese/German/Russian courses through credit exchange. ② Restrictions for Korean/International students will only be applied for students entered from 2021.

## ■ Language Exemption Guideline

Students who meet language exam criteria below will have their language requirements exempted.

Category	Type of Exam	Score (Criteria)
Chinese 중국어	HSK	Lev.5 or higher
Spanish 스페인어	DELE	A2 or higher
Japanese 일본어	JLPT	N2 or higher
German 독일어	Goethe -Zertifikat	A2 or higher
French 프랑스어	DELF	A2 or higher
Russian 러시아어	TORFL	Lev.1 or higher
Korean (For International Students)	TOPIK	Lev.3 or higher

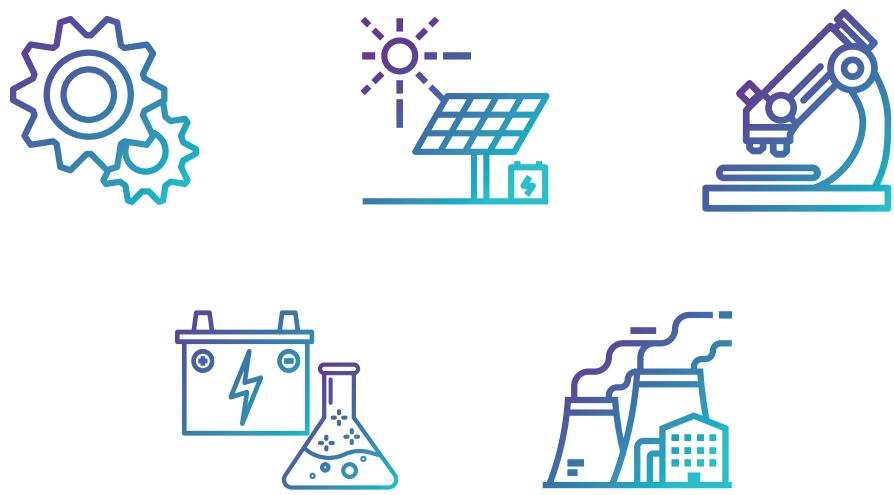
## ■ English requirements by level [레벨별 이수 가이드]

All students should take English Level test and take 2 courses (4 credits) according to the level.

Course Code	Course Title	Lev.1	Lev.2	Lev.3	Lev.4
-	English Camp (0 credit)	●	-	-	-
ENG110	English Listening & Speaking (Intermediate)	●	●	-	-
ENG111	English Listening & Speaking (Advanced)	-	-	●	-
ENG112	English Reading & Writing	●	●	●	-

\* Lev.4 students will have English courses exempted. (Applies to all students including students entered before 2021) [레벨4는 영어 수업 이수 면제됨 – 2021학년도 이전 입학생들에게도 전부 적용됨]

\* In case of English native speakers, English requirements can be exempted by submitting relevant documents that can prove 3-years or more experience in English-speaking high school (ex.certificate of graduation, etc.) and getting permission from English course instructors. [영어 원어민의 경우, 영어권 고등학교에서 3년이상 재학 및 수료자임을 증빙할 수 있는 자료(졸업증명서)를 제출 후 영어 교과 담당교원 승인을 통해 영어 과목 이수를 면제 받을 수 있음]



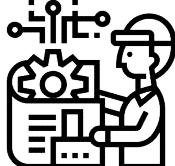
# College of Engineering

## [공과대학]

# Department of Mechanical Engineering

## [기계공학과]

### ■ Department Introduction [학과소개]



Mechanical Engineering deals with numerous systems and has a variety of important applications such as automobiles, aircraft, ships, home appliances, electronic devices, power plants and so on. The mechanical systems and the fundamental science and technology of mechanical and aerospace engineering have made dramatic advances and high impacts on the global economies and the standard of living. In the track of mechanical and aerospace engineering, students are educated and trained to learn the underlying principles of mechanical and aerospace engineering and to apply the knowledge to real-world examples and case studies hands-on. Disciplines include thermodynamics, fluid mechanics, solid mechanics, dynamics, machine design, advanced materials processing, laser-assisted manufacturing, micro/nano machining, unmanned vehicle control, MEMS, biomedical products, controls and mechatronics, acoustics, tribology and so on.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분		Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17	Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 30 Credits
	Elective 선택[학과 지정]	13	Complete basic elective courses at least 13 credits including Applied Linear Algebra(3) and Differential Equations(3)	
Major 전공	Required 필수	27	Refer to Required course list below	At least 48 Credits
	Elective 선택	21	Refer to Elective course list below	
	Internship 인턴십	3	Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택		19	All courses acceptable	At least 19 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 credits	6 credits	-
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	●	●	
7	MTH203	Applied Linear Algebra (3)	●	●	
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI101	Understanding Major (1) <b>Mechanical Engineering and Future</b>	○		

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [기계공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Mechanical Engineering	27	21	48	18	18	36	9	9	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remarks	Semester
MEN210	Thermodynamics 열역학	○	○	○	3-3-0		1
MEN220	Fluid Mechanics 유체역학	○	○	○	3-3-0		2
MEN230	Solid Mechanics I 고체역학 I	○	○	○	3-3-0		1
MEN231	Solid Mechanics II 고체역학 II	○	○	○	3-3-0	[PRE] MEN230	2
MEN250	Mechanical Drawing and Lab 기계제도 및 실습	○	○	○	3-2-2		1
MEN270	Dynamics 동역학	○	○	○	3-3-0		2
MEN300	Mechanical Engineering Lab I 기계공학실험 I	○	○	○	3-1-4	[PRE] MEN231, MEN310 [PRE] MEN210, MEN220	2
MEN310	Heat Transfer 열전달	○	○	○	3-3-0		1

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remarks	Semester
MEN490	Thesis Study 졸업연구	○			3-0-6		1,2
	Total	27	24	24			

※ Double Major: Take 6 courses(18 credits) among above courses excluding MEN490 Thesis Study.

복수전공: 졸업연구를 제외한 8과목 중 최소 6과목(18학점) 이수

※ Minor: Take 3 courses(9 credits) among above excluding MEN490 Thesis Study.

부전공: 졸업연구를 제외한 8과목 중 최소 3과목(9학점) 이수

※ Courses that are not required for Minor/Double Major can be counted as Elective course.

복수전공자, 부전공자에게 필수로 인정되지 않는 전공필수 과목을 이수했을 경우 전공선택으로 인정가능

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remark	Semester
MEN201	Computational Tools for Engineers 공학전산기법	○	○	○	3-3-0		2
MEN211	Applied Thermodynamics 응용열역학	○	○	○	3-3-0	[PRE] MEN210	2
MEN301	Numerical Analysis 수치해석	○	○	○	3-2-2	[PRE] MTH201	2
MEN302	Introduction to Finite Element Method 유한요소법개론	○	○	○	3-3-0	[PRE] MEN231	2
MEN303	Applied Engineering Mathematics 응용공학수학	○	○	○	3-3-0		1
MEN320	Applied Fluid Mechanics 응용유체역학	○	○	○	3-3-0	[PRE] MEN220	1
MEN350	Manufacturing Processes and Lab 기계공작법 및 실습	○	○	○	3-2-2	[PRE] MEN230	1
MEN351	Machine Element Design 기계요소설계	○	○	○	3-3-0	[PRE] MEN231	2
MEN352	Creative Engineering Design I (Capstone Design) 창의적공학설계 I (캡스톤디자인)	○	○	○	3-1-4		2
MEN353	Manufacturing System Design & Simulation 생산시스템 설계 및 시뮬레이션	○	○	○	3-3-0		2
MEN370	Dynamic Systems and Control 시스템제어	○	○	○	3-3-0		1
MEN371	System Dynamics 시스템 동역학	○	○	○	3-3-0		1
MEN400	Mechanical Engineering Lab II 기계공학실험 II	○	○	○	3-1-4	[PRE] MEN231, MEN270, MEN310	1
MEN411	Combustion 연소공학	○	○	○	3-3-0	[PRE] MEN210, MEN220	1
MEN412	Air-Conditioning and Refrigeration 공기조화냉동	○	○	○	3-3-0	[PRE] MEN210	2
MEN413	Computational Fluid Dynamics 전산유체역학	○	○	○	3-3-0	[PRE] MEN301, MEN320	2
MEN414	Design of Fluid Thermal Systems 열유체시스템 설계	○	○	○	3-3-0	[PRE] MEN310	2
MEN415	Aerodynamics 공기역학	○	○	○	3-3-0	[PRE] MEN220	1
MEN420	Introduction to Aerosol Technology 에어로졸공학개론	○	○	○	3-3-0	[PRE] MEN220	1

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remark	Semester
MEN431	Introduction to Plastic Deformation 소성학개론	○	○	○	3-3-0	[PRE] MEN231	1
MEN432	Introduction to Mechanics of Composite Materials 복합재역학개론	○	○	○	3-3-0	[PRE] MEN231	1
MEN451	Introduction to MEMS MEMS 개론	○	○	○	3-3-0		1
MEN452	Creative Engineering Design II (Capstone Design) 창의적공학설계 II (캡스톤디자인)	○	○	○	3-1-4		1
MEN453	Computer Aided Engineering 컴퓨터이용공학	○	○	○	3-2-2		1
MEN454	Optimal Design 최적설계	○	○	○	3-2-2		1
MEN455	3D Printing 3D 프린팅	○	○	○	3-3-0		1
MEN457	Introduction to Electric-Electronic Engineering 전기전자공학개론	○	○	○	3-3-0	[PRE] PHY103	1
MEN461	Introduction to Robotics 로봇공학	○	○	○	3-3-0		2
MEN470	Mechanical Vibration 기계진동학	○	○	○	3-3-0	[PRE] MEN270	2
MEN481	UAV Flight Control and Simulation 무인기 비행제어 및 시뮬레이션	○	○	○	3-3-0	[PRE] MEN270, MEN370	1
MEN482	UAV Navigation and Flight Computers 무인기 항법 및 운용	○	○	○	3-3-0	[PRE] MEN270, MEN370	2
MEN497	Special Topics in Mechanical Engineering I 기계공학특론 I	○	○	○	3-3-0		-
MEN498	Special Topics in Mechanical Engineering II 기계공학특론 II	○	○	○	3-3-0		-
MEN499	Special Topics in Mechanical Engineering III 기계공학특론 III	○	○	○	3-3-0		-
UEE231	Mechanics of Materials 재료역학	○	○		3-3-0	[PRE] UEE203	2
UEE324	Environmental Thermodynamics 환경열역학	○	○		3-3-0		1
UEE331	Structural Analysis 구조역학	○	○		3-3-0	[PRE] UEE231	1
UEE332	Matrix Structural Analysis 매트릭스구조해석	○	○		3-3-0		1
UEE413	Hydraulics 수리학	○	○		3-3-0		-
UEE432	Introduction to Structural Dynamics 구조동역학개론 (구조진동론)	○	○		3-3-0		2
MSE202	Introduction to Materials Science and Engineering 재료공학개론	○	○		3-3-0		1
MSE370	Introduction to Polymer Materials 고분자재료개론	○	○		3-3-0		2
MSE311	Introduction to Metallic Materials 금속재료개론	○	○		3-3-0		2
MSE354	Introduction to Semiconductor 반도체개론	○	○		3-3-0		1
DES201	Design Elements and Principles 디자인요소와 원리	○	○		3-2-2		1

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remark	Semester
DES221	Design History & Contexts 디자인 역사와 맥락	○	○		3-3-0		1
BME310	Experimental Design 실험계획법	○	○		3-3-0	[PRE] MTH211	1
BME421	Nano-Bio Engineering 나노바이오공학	○	○		3-3-0		1
BME433	Laser and Biomedical Application 레이저와 바이오 응용	○	○		3-3-0		1
PHY441	Fluid Physics 유체물리학	○	○		3-3-0		2
<b>Total</b>		<b>150</b>	<b>150</b>	<b>102</b>			

※ [PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

※ Students affiliated in previous SDM, TFP, MAE, MEN track can take courses from the department of Mechanical Engineering (except for MEN490 Thesis Study) and those courses can be counted as required or elective according to the year that took the course.

※ 기존 SDM, TFP, MEN, MAE 트랙 학생들은 기계공학과 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음 (MEN490 졸업연구 제외)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
MEN SDC	SDC202 (SDC Required) Computational Tools for Engineers 공학전산기법	→	MEN201 (Elective) Computational Tools for Engineers 공학전산기법
	MEN211 (Selective Required) Applied Thermodynamics 응용열역학		MEN211 (Elective) Applied Thermodynamics 응용열역학
	MEN301 (Selective Required) Numerical Analysis 수치해석		MEN301 (Elective) Numerical Analysis 수치해석 Prerequisite: MTH201
	MEN302 (Elective) Introduction to Finite Element Method 유한요소법개론 Prerequisite: MEN230		MEN302 (Elective) Introduction to Finite Element Method 유한요소법개론 Prerequisite: MEN231
	MEN320 (Selective Required) Applied Fluid Mechanics 응용유체역학		MEN320 (Elective) Applied Fluid Mechanics 응용유체역학
	MEN350 (Selective Required) Manufacturing Processes and Lab 기계공작법 및 실습		MEN350 (Elective) Manufacturing Processes and Lab 기계공작법 및 실습
	MEN351 (Selective Required) Machine Element Design 기계요소설계		MEN351 (Elective) Machine Element Design 기계요소설계
	SDC304 (SDC Elective) Manufacturing System Design & Simulation 생산시스템 설계 및 시뮬레이션		MEN353 (Elective) Manufacturing System Design & Simulation 생산시스템 설계 및 시뮬레이션
	MEN370 (Selective Required) Dynamic Systems and Control 시스템제어		MEN370 (Elective) Dynamic Systems and Control 시스템제어
	SDC306 (SDC Required) System Dynamics 시스템 동역학		MEN371 (Elective) System Dynamics 시스템 동역학

Track	2020	→	2021
MEN SDC	SDC405 (SDC Elective) 3D Printing 3D 프린팅	→	MEN455 (Elective) 3D Printing 3D 프린팅
	SDC401 (SDC Required) Introduction to Mechatronics 메카트로닉스개론 〈폐지 Abolished〉		MEN231 (Required) Solid Mechanics II 고체역학 II 〈대체과목 Substitution〉
	SDC403 (SDC Required) Project Lab 프로젝트 랩 〈폐지 Abolished〉		MEN490 (Required) Thesis Study 졸업연구 〈대체과목 Substitution〉
	SDC302 (SDC Elective) Circuit Theory & Lab 회로이론 및 실험 〈폐지 Abolished〉		MEN457 (Elective) Introduction to Electric-Electronic Engineering 전기전자공학개론 〈대체과목 Substitution〉
	SDC402 (SDC Elective) Applied Robotics 응용로봇공학 〈폐지 Abolished〉		MEN461 (Elective) Introduction to Robotics 로봇공학 〈대체과목 Substitution〉

\* Existing SDC track students under the school of MANE may take SDC courses according to the table above.

\* 기존 기계항공및원자력공학부 제어설계공학트랙의 경우 위 표의 기계공학과로 편입된 과목 혹은 폐지과목의 경우 대체과목 이수

Department of Mechanical Engineering

## 5. Curriculum Map [교육과정 이수 체계도]

Sophomore		Junior		Senior	
1 <sup>st</sup> semester	2 <sup>nd</sup> semester	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	1 <sup>st</sup> semester	2 <sup>nd</sup> semester
Thermodynamics	Applied Thermodynamics	Heat Transfer		Introduction to Aerosol Technology	Air-Conditioning and Refrigeration
				Introduction to Electric–Electronic Engineering	
Solid Mechanics I	Solid Mechanics II	Manufacturing Processes and Lab	Manufacturing System Design and Simulation	Introduction to Plastic Deformation	Introduction to MEMS
				Introduction to Mechanics of Composite Materials	
Mechanical Drawing and Lab	Mechanical Drawing and Lab	Machine Element Design	Creative Engineering Design I	Creative Engineering Design II	Optimal Design
					Thesis Study
	Fluid Mechanics		Computational Fluid Dynamics	Combustion	Design and Fluid Thermal Systems
	Dynamics	System Control	Introduction to Robotics	3D Printing	Mechanical Vibration
					Thesis Study
			Mechanical Vibration		UAV Navigation and Flight Computers
Differential Equations	Applied Liner Algebra	Applied Engineering Mathematics	Mechanical Engineering Lab I	Mechanical Engineering Lab II	
	Computational Tools for Engineers		Numerical Analysis	Computer Aided Engineering	
					Thesis Study

# Department of Urban and Environmental Engineering [도시환경공학과]

## ■ Department Introduction [학과소개]



Climate change and environmental pollution caused by global urbanization and industrialization have imposed an increasing threat to the entire future of mankind. With no surprise, studies on these issues are drastically gaining in importance. Urban and Environmental Engineering is an interdisciplinary field of study that is dedicated to education and research on the resilient protection of natural and built environments against disasters, as well as the sustainable development of urban society. In this field, the students will learn fundamental knowledge associated with urban and environmental issues, and will explore more advanced courses regarding Environmental Sciences and Engineering (climate change, water and air treatment, environmental analysis and modeling), Urban Infrastructure Engineering (urban planning, construction materials, structural mechanics and design, health monitoring), and Disaster Management Engineering (fine dust, earthquake, typhoon). The Department of Urban and Environmental Engineering at UNIST is committed to developing innovative technologies in the related fields and cultivating future leaders who will make a huge impact on our profession and society.

## 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 30 Credits
	Elective 선택[학과 지정]	13 1) "What you may (not) want to know about cities and environment" is included in the fundamental elective, but not included in the requirement for graduation 2) All the other fundamental elective courses will be accepted in UEE	
Major 전공	Required 필수	15 Refer to Required course list below	At least 54 Credits
	Elective 선택	39 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	13	All courses acceptable	At least 13 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

Department of Urban and Environmental Engineering

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 Credits		
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	○		
7	MTH203	Applied Linear Algebra (3)	○		
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI102	Understanding Major (1) <b>What you may (not) want to know about cities and environment</b>	○		

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [도시환경공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Urban and Environmental Engineering	15	39	<b>54</b>	12	24	<b>36</b>	6	12	<b>18</b>

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remarks	Seme ster
UEE201	Introduction to Environmental Engineering 환경공학개론	○	○	○	3-3-0	-	1
UEE202	Earth and Environmental Sciences 지구환경과학	○	○	○	3-3-0	-	1
UEE203	Introduction to Civil Engineering 건설공학개론	○	○	○	3-3-0	-	1
UEE204	Introduction to Urban Planning 도시계획개론	○	○	○	3-3-0	-	1
UEE205	Introduction to Natural Hazards 자연재해개론	○	○	○	3-3-0	-	1
UEE490	Graduate Thesis 졸업논문	○	-	-	0 credit	-	1,2
<b>Total</b>		<b>15</b>	<b>15</b>	<b>15</b>			

\* Double major students can choose 4 subjects out of 5 required courses above, and minor for 2 subjects.

## ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect. -Exp.	Remark	Semester
UEE206	Science Humanities 과학인문학	○	○	○	3-3-0		1
UEE211	Environmental Chemistry 환경화학	○	○	○	3-3-0		1
UEE212	Water Pollution 수질오염	○	○	○	3-3-0		-
UEE213	Environmental Colloids Science 환경콜로이드과학	○	○	○	3-3-0		2
UEE221	Air Pollution 대기오염	○	○	○	3-3-0		2
UEE222	Atmosphere and Ocean Sciences 대기해양과학	○	○	○	3-3-0		2
UEE223	Atmospheric Physics 대기물리	○	○	○	3-3-0		1
UEE224	Atmospheric Chemistry 대기화학	○	○	○	3-3-0		2
UEE231	Mechanics of Materials 재료역학	○	○	○	3-3-0	[PRE] UEE203	2
UEE241	Geographic Information System 지리정보시스템	○	○	○	3-3-0		2
UEE311	Water Treatment Engineering 수처리공학	○	○	○	3-3-0		-
UEE312	Biomass and Bioenergy 바이오매스 및 바이오에너지	○	○	○	3-3-0		1
UEE313	Aquatic Chemistry Laboratory 수질화학실험	○	○	○	3-1-4		-
UEE314	Environmental Data Analysis and Practice 환경데이터분석	○	○	○	3-3-0		1
UEE321	Analysis of Pollutants 오염물질분석 및 실험	○	○	○	3-1-4		1
UEE322	Introduction to Remote Sensing 원격탐사개론	○	○	○	3-3-0		1
UEE323	Atmospheric Dynamics 대기역학	○	○	○	3-3-0		1
UEE324	Environmental Thermodynamics 환경열역학	○	○	○	3-3-0		1
UEE331	Structural Analysis 구조역학	○	○	○	3-3-0	[PRE] UEE231	1
UEE332	Matrix Structural Analysis 매트릭스구조해석	○	○	○	3-3-0		1
UEE333	Concrete Structures 콘크리트구조공학	○	○	○	3-3-0	[PRE] UEE231	-
UEE334	Properties of Concrete 콘크리트재료공학	○	○	○	3-3-0		1
UEE335	Structural Engineering Lab 구조공학실험	○	○	○	3-1-4	[PRE] UEE231	-
UEE336	Soil Mechanics 토질역학	○	○	○	3-3-0		1
UEE341	Urban Transportation Planning 교통계획	○	○	○	3-3-0		1
UEE342	Urban Development 도시개발	○	○	○	3-3-0		2
UEE351	Probability Concepts in Engineering 공학확률	○	○	○	3-3-0		2

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Course Code	Course Title	Major	Double	Minor	Cred -Lect. -Exp.	Remark	Semester
UEE352	Disaster Management 재난관리	○	○	○	3-3-0		1
UEE353	Numerical Modeling and Analysis 수치모델링및분석	○	○	○	3-3-0		2
UEE354	Disaster Risk Analysis 재난위험성분석	○	○	○	3-3-0		-
UEE411	Water and Wastewater Engineering 상하수도공학	○	○	○	3-3-0		-
UEE412	Environmental Bioprocess 환경생물공정	○	○	○	3-3-0		1
UEE413	Hydraulics 수리학	○	○	○	3-3-0		-
UEE414	Water Treatment Modeling: Principles and Practice 수처리모델링	○	○	○	3-3-0		-
UEE421	Earth Environment Numerical Analysis 지구환경전산실습	○	○	○	3-1-4		-
UEE422	Climate Change Engineering 기후변화공학	○	○	○	3-3-0		2
UEE423	GIS-Based Modeling GIS기반모델링	○	○	○	3-3-0		2
UEE424	Statistics in Earth and Environmental Sciences 지구환경통계학	○	○	○	3-3-0		-
UEE431	Steel Structures 강구조공학	○	○	○	3-3-0	[PRE] UEE231	1
UEE432	Introduction to Structural Dynamics 구조동역학개론 (구조진동론)	○	○	○	3-3-0		2
UEE433	Construction Materials 건설재료공학	○	○	○	3-3-0	[PRE] UEE203	2
UEE434	Foundation Engineering 기초공학	○	○	○	3-3-0		-
UEE441	Urban Design 도시설계	○	○	○	3-3-0		1
UEE451	Weather Analysis and Prediction 날씨 분석 및 예측	○	○	○	3-3-0	[PRE] UEE205	2
UEE452	Satellite Remote Sensing 위성원격탐사	○	○	○	3-3-0		2
UEE491	Special Topics in Urban and Environmental Engineering I 도시환경공학특론 I	○	○	○	3-3-0		-
UEE492	Special Topics in Urban and Environmental Engineering II 도시환경공학특론 II	○	○	○	3-3-0		-
UEE493	Special Topics in Urban and Environmental Engineering III 도시환경공학특론 III	○	○	○	3-3-0		-
UEE494	Special Topics in Urban and Environmental Engineering IV 도시환경공학특론 IV	○	○	○	3-3-0		-
UEE495	Special Topics in Urban and Environmental Engineering V 도시환경공학특론 V	○	○	○	3-3-0		-
MGT211	Microeconomics 미시경제학	○	○	○	3-3-0	[PRE] MGT106	2
MGT315	Econometrics 계량경제학	○	○	○	3-3-0	[PRE] MGT211	1
MEN220	Thermodynamics 유체역학	○	○	○	3-3-0		2

Course Code	Course Title	Major	Double	Minor	Cred -Lect. -Exp.	Remark	Semester
MEN301	Numerical Analysis 수치해석	○	○	○	3-2-2	[PRE] MTH201	2
IE207	Statistical Computing 통계계산	○	○	○	3-3-0		2
IE303	Data Mining 데이터마이닝	○	○	○	3-3-0		1
IE313	Time-series Analysis 시계열분석	○	○	○	3-3-0	[PRE] MTH211	2
IE406	Applied Machine Learning 기계학습 응용	○	○	○	3-3-0	[PRE] IE303, MTH211	1
IE408	Principles of Deep Learning 딥러닝 원론	○	○	○	3-3-0	[PRE] ITP117, IE303	1
IE422	Social Network Analysis 사회연결망분석	○	○	○	3-3-0	[PRE] IE303	2
BIO331	Microbiology 미생물학	○	○	○	3-3-0		1
CHM211	Organic Chemistry I 유기화학 I	○	○	○	3-3-0	[IDEN] ECHE201	1,2
CHM212	Organic Chemistry II 유기화학 II	○	○	○	3-3-0	[IDEN] ECHE202	1,2
CHM231	Physical Chemistry I 물리화학 I	○	○	○	3-3-0	[IDEN] ECHE203	1
CHM232	Physical Chemistry II 물리화학 II	○	○	○	3-3-0		2
CHM391	Instrumental Analysis 기기분석	○	○	○	3-3-0	[IDEN] ECHE322	2
<b>Total</b>		<b>198</b>	<b>198</b>	<b>198</b>			

※ [PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

※ Students affiliated in previous ESE, UIE, and DME track can take newly opened course in department of UEE and the course can be counted as required or elective (refer to each year curriculum)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
UIE ESE DME	ESE201 Introduction to Environmental Engineering 환경공학개론	⇒	UEE201 Introduction to Environmental Engineering 환경공학개론
	ESE203 Earth and Environmental Sciences 지구환경과학		UEE202 Earth and Environmental Sciences 지구환경과학
	UIE201 Introduction to Civil Engineering 건설공학개론		UEE203 건설공학개론 Introduction to Civil Engineering
	UIE203 Introduction to Urban Planning 도시계획개론		UEE204 Introduction to Urban Planning 도시계획개론
	DME201 Introduction to Natural Hazards 자연재해개론		UEE205 Introduction to Natural Hazards 자연재해개론
	ESE243 Science Humanities 과학인문학		UEE206 Science Humanities 과학인문학
	ESE202 Environmental Chemistry 환경화학		UEE211 Environmental Chemistry 환경화학
	ESE204 Water Pollution 수질오염		UEE212 Water Pollution 수질오염
	ESE242 Environmental Colloids Science 환경콜로이드과학		UEE213 Environmental Colloids Science 환경콜로이드과학

Track	2020	→	2021
UIE ESE DME	ESE205 Air Pollution 대기오염	→	UEE221 Air Pollution 대기오염
	ESE232 Atmosphere and Ocean Sciences 대기해양과학		UEE222 Atmosphere and Ocean Sciences 대기해양과학
	ESE233 Atmospheric Physics 대기물리		UEE223 Atmospheric Physics 대기물리
	DME221 Atmospheric Chemistry 대기화학		UEE224 Atmospheric Chemistry 대기화학
	UIE204 Mechanics of Materials 재료역학		UEE231 Mechanics of Materials 재료역학
	UIE210 Geographic Information System 지리정보시스템		UEE241 Geographic Information System 지리정보시스템
	ESE311 Water Treatment Engineering 수처리공학		UEE311 Water Treatment Engineering 수처리공학
	ESE313 Aquatic Chemistry Laboratory 수질화학실험		UEE313 Aquatic Chemistry Laboratory 수질화학실험
	ESE314 Environmental Data Analysis and Practice 환경데이터분석		UEE314 Environmental Data Analysis and Practice 환경데이터분석
	ESE331 Analysis of Pollutants 오염물질분석 및 실험		UEE321 Analysis of Pollutants 오염물질분석 및 실험
	ESE333 Introduction to Remote Sensing 원격탐사개론		UEE322 Introduction to Remote Sensing 원격탐사개론
	ESE334 Atmospheric Dynamics 대기역학		UEE323 Atmospheric Dynamics 대기역학
	ESE337 Environmental Thermodynamics 환경열역학		UEE324 Environmental Thermodynamics 환경열역학
	UIE303 Structural Analysis 구조역학		UEE331 Structural Analysis 구조역학
	UIE304 Matrix Structural Analysis 매트릭스구조해석		UEE332 Matrix Structural Analysis 매트릭스구조해석
	UIE306 Concrete Structures 콘크리트구조공학		UEE333 Concrete Structures 콘크리트구조공학
	UIE307 Properties of Concrete 콘크리트재료공학		UEE334 Properties of Concrete 콘크리트재료공학
	UIE308 Structural Engineering Lab 구조공학실험		UEE335 Structural Engineering Lab 구조공학실험
	UIE305 Soil Mechanics 토질역학		UEE336 Soil Mechanics 토질역학
	UIE301 Urban Transportation Planning 교통계획		UEE341 Urban Transportation Planning 교통계획
	UIE309 Urban Development 도시개발론		UEE342 Urban Development 도시개발
	DME311 Probability Concepts in Engineering 공학확률		UEE351 Probability Concepts in Engineering 공학확률
	DME331 Disaster Management 재난관리		UEE352 Disaster Management 재난관리
	DME321 Numerical Modeling and Analysis 수치모델링및분석		UEE353 Numerical Modeling and Analysis 수치모델링및분석
	DME332 Disaster Risk Analysis 재난위험성분석 (도시방재학)		UEE354 Disaster Risk Analysis 재난위험성분석
	ESE411 Water and Wastewater Engineering 상하수도공학		UEE411 Water and Wastewater Engineering 상하수도공학

Track	2020	→	2021
UIE ESE DME	ESE414 Environmental Bioprocess 환경생물공정	→	UEE412 Environmental Bioprocess 환경생물공정
	ESE416 Hydraulics 수리학		UEE413 Hydraulics 수리학
	ESEE417 Water Treatment Modeling: Principles and Practice 수처리모델링		UEE414 Water Treatment Modeling: Principles and Practice 수처리모델링
	ESE432 Earth Environment Numerical Analysis 지구환경전산실습		UEE421 Earth Environment Numerical Analysis 지구환경전산실습
	ESE434 Climate Change Engineering 기후변화공학		UEE422 Climate Change Engineering 기후변화공학
	ESE435 GIS-Based Modeling GIS기반모델링		UEE423 GIS-Based Modeling GIS기반모델링
	ESE436 Statistics in Earth and Environmental Sciences 지구환경통계학		UEE424 Statistics in Earth and Environmental Sciences 지구환경통계학
	UIE401 Steel Structures 강구조공학		UEE431 Steel Structures 강구조공학
	UIE408 Introduction to Structural Dynamics 구조동역학개론 (구조진동론)		UEE432 Introduction to Structural Dynamics 구조동역학개론 (구조진동론)
	UIE409 Construction Materials 건설재료공학		UEE433 Construction Materials 건설재료공학
	UIE403 Foundation Engineering 기초공학		UEE434 Foundation Engineering 기초공학
	UIE405 Urban Design 도시설계		UEE441 Urban Design 도시설계
	DME421 Weather Analysis and Prediction 날씨 분석 및 예측		UEE451 Weather Analysis and Prediction 날씨 분석 및 예측
	DME422 Satellite Remote Sensing 위성원격탐사		UEE452 Satellite Remote Sensing 위성원격탐사
	ESE241 Environmental Mathematics 환경수학		⟨Closed⟩
	ESE312 Soil Pollution 토양오염		⟨Closed⟩
	ESE335 Biogeochemistry 생지화학		⟨Closed⟩
	ESE341 Environmental Aquatic Organic Chemistry 환경수유기화학		⟨Closed⟩
	ESE412 Environmental Remediation 환경복원		⟨Closed⟩
	ESE413 Waste Management 폐기물처리/자활용		⟨Closed⟩
	ESE415 Environmental Toxicology 환경독성학		⟨Closed⟩
	ESE421 Special Topics in Environmental Engineering I 환경공학특론 I		⟨Closed⟩
	ESE422 Special Topics in Environmental Engineering II 환경공학특론 II		⟨Closed⟩
	ESE423 Special Topics in Environmental Engineering III 환경공학특론 III		⟨Closed⟩
	ESE431 Climate Dynamics 기후역학		⟨Closed⟩
	ESE437 Multimedia Environmental Modeling 다매체환경모델링		⟨Closed⟩

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Track	2020	→	2021
UIE ESE DME	ESE441 Special Topics in Earth Science I 지구환경특론 I	⇒	⟨Closed⟩
	ESE442 Special Topics in Earth Science II 지구환경특론 II		⟨Closed⟩
	ESE443 Special Topics in Earth Science I 지구환경특론 III		⟨Closed⟩
	UIE202 Sustainable Design 환경설계론		⟨Closed⟩
	UIE402 Design of Structural Systems 구조시스템설계		⟨Closed⟩
	UIE404 Infrastructure Engineering 사회기반시설공학		⟨Closed⟩
	UIE410 Special Topics in Urban Infrastructure Engineering I 도시건설공학특론 I		⟨Closed⟩
	UIE411 Special Topics in Urban Infrastructure Engineering II 도시건설공학특론 II		⟨Closed⟩
	UIE412 Special Topics in Urban Infrastructure Engineering III 도시건설공학특론 III		⟨Closed⟩
	DME202 Man-made Disasters 인적재해		⟨Closed⟩
	DME341 Water Resources Engineering 수자원공학		⟨Closed⟩
	DME342 Hydrology 수문학		⟨Closed⟩
	DME411 Hazard Analysis for System Safety 재해분석과 시스템안전성		⟨Closed⟩
	DME431 Disasters and Environmental Economics 재난 및 환경경제학		⟨Closed⟩
	DME432 Vulnerability and Capacity Analysis 재해취약성 및 수용력분석		⟨Closed⟩
	DME491 Special Topics in Disaster Management Engineering I 재난관리공학특론 I		⟨Closed⟩
	DME492 Special Topics in Disaster Management Engineering II 재난관리공학특론 II		⟨Closed⟩
	DME493 Special Topics in Disaster Management Engineering III 재난관리공학특론 III		⟨Closed⟩

## 5. Curriculum Map [교육과정 이수 체계도]

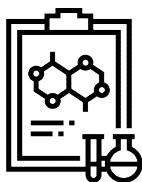
		● Environmental Eng. ● Environmental Science ● Construction Eng. ● Urban Planning ● Disaster Management
Course Code	Course Title	Recommendation by each detailed majors
UEE206	Science Humanities 과학인문학	● ○ ● ● ●
UEE211	Environmental Chemistry 환경화학	● ○ ○ ○ ○
UEE212	Water Pollution 수질오염	● ○ ○ ○ ●
UEE213	Environmental Colloids Science 환경콜로이드과학	● ○ ○ ○ ○
UEE221	Air Pollution 대기오염	● ○ ○ ○ ●
UEE222	Atmosphere and Ocean Sciences 대기해양과학	○ ○ ○ ○ ●
UEE223	Atmospheric Physics 대기물리	○ ○ ○ ○ ○
UEE224	Atmospheric Chemistry 대기화학	○ ○ ○ ○ ●
UEE231	Mechanics of Materials 재료역학	○ ○ ● ○ ●
UEE241	Geographic Information System 지리정보시스템	○ ○ ● ● ●
UEE311	Water Treatment Engineering 수처리공학	● ○ ○ ○ ○
UEE312	Biomass and Bioenergy 바이오매스 및 바이오에너지	● ○ ○ ○ ○
UEE313	Aquatic Chemistry Laboratory 수질화학실험	● ○ ○ ○ ○
UEE314	Environmental Data Analysis and Practice 환경데이터분석	● ○ ○ ○ ○
UEE321	Analysis of Pollutants 오염물질분석 및 실험	● ○ ○ ○ ○
UEE322	Introduction to Remote Sensing 원격탐사개론	○ ○ ● ● ●
UEE323	Atmospheric Dynamics 대기역학	○ ○ ○ ○ ○
UEE324	Environmental Thermodynamics 환경열역학	● ○ ○ ○ ○
UEE331	Structural Analysis 구조역학	○ ○ ● ○ ●
UEE332	Matrix Structural Analysis 매트릭스구조해석	○ ○ ● ○ ○
UEE333	Concrete Structures 콘크리트구조공학	○ ○ ● ○ ○
UEE334	Properties of Concrete 콘크리트재료공학	○ ○ ● ○ ○
UEE335	Structural Engineering Lab 구조공학실험	○ ○ ● ○ ○
UEE336	Soil Mechanics 토질역학	○ ○ ● ○ ●
UEE341	Urban Transportation Planning 교통계획	○ ○ ○ ● ○
UEE342	Urban Development 도시개발	○ ○ ○ ● ○

Department of Urban and Environmental Engineering

Course Code	Course Title	Recommendation by each detailed majors
UEE351	Probability Concepts in Engineering 공학확률	● ○ ● ● ●
UEE352	Disaster Management 재난관리	○ ○ ○ ● ●
UEE353	Numerical Modeling and Analysis 수치모델링및분석	● ○ ● ○ ●
UEE354	Disaster Risk Analysis 재난위험성분석	○ ○ ○ ● ●
UEE411	Water and Wastewater Engineering 상하수도공학	● ○ ● ○ ○
UEE412	Environmental Bioprocess 환경생물공정	● ○ ○ ○ ○
UEE413	Hydraulics 수리학	● ○ ● ○ ○
UEE414	Water Treatment Modeling: Principles and Practice 수처리모델링	● ○ ○ ○ ○
UEE421	Earth Environment Numerical Analysis 지구환경전산실습	○ ○ ○ ○ ○
UEE422	Climate Change Engineering 기후변화공학	● ○ ○ ○ ○
UEE423	GIS-Based Modeling GIS기반모델링	○ ○ ● ● ●
UEE424	Statistics in Earth and Environmental Sciences 지구환경통계학	○ ○ ○ ○ ○
UEE431	Steel Structures 강구조공학	○ ○ ● ○ ○
UEE432	Introduction to Structural Dynamics 구조동역학개론 (구조진동론)	○ ○ ● ○ ●
UEE433	Construction Materials 건설재료공학	○ ○ ● ○ ○
UEE434	Foundation Engineering 기초공학	○ ○ ● ○ ●
UEE441	Urban Design 도시설계	○ ○ ○ ● ●
UEE451	Weather Analysis and Prediction 날씨 분석 및 예측	○ ○ ○ ○ ●
UEE452	Satellite Remote Sensing 위성원격탐사	○ ○ ○ ● ○
UEE491	Special Topics in Urban and Environmental Engineering I 도시환경공학특론 I	● ○ ● ● ●
UEE492	Special Topics in Urban and Environmental Engineering II 도시환경공학특론 II	● ○ ● ● ●
UEE493	Special Topics in Urban and Environmental Engineering III 도시환경공학특론 III	● ○ ● ● ●
UEE494	Special Topics in Urban and Environmental Engineering IV 도시환경공학특론 IV	● ○ ● ● ●
UEE495	Special Topics in Urban and Environmental Engineering V 도시환경공학특론 V	● ○ ● ● ●

# Department of Materials Science and Engineering [신소재공학과]

## ■ Department Introduction [학과소개]



The Department of Materials Science & Engineering is an interdisciplinary field which emphasizes the study on the interrelationship among processing, structure, and properties in materials. One who is in this discipline will be able to identify the key issues and strategies for any given challenges in materials development, based on deep understanding of the interrelationship. To this end, the Department of Materials Science & Engineering offers a range of subjects from fundamentals such as Thermodynamics in Materials and Crystallography to up-to-dated advanced courses covering specific topics such as next generation semiconductors, energy conversion materials, and flexible materials.

## 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 32 Credits
	Elective 선택[학과 지정]	15 Recommended: General Physics II(3), General Chemistry II(3), Differential Equations(3), Applied Linear Algebra(3), Introduction to AI Programming II(3)	
Major 전공	Required 필수	21 Refer to Required course list below	At least 51 Credits
	Elective 선택	30 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op) <b>*Department graduation requirement: Complete at least 3 credits of research internship or Coop internship and submit internship report</b>	3 Credits
Free Elective 자유선택	14	All courses acceptable	At least 14 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

Department of Materials Science and Engineering

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			15 credits	-	-
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)	●		
3	CHM102	General Chemistry II (3)	●		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	●		
7	MTH203	Applied Linear Algebra (3)	●		
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	●		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI103	Understanding Major (1) <b>Trend in Materials Science and Engineering</b>	○		

●: Required ○: Elective ●: Recommended, ( ): credits

\*It is recommended to take the above recommended courses for Double major/Minor students.

## 3. Curriculum [신소재공학과 교육과정] ※Course opening semester is subject to change.

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Materials Science and Engineering	21	30	<b>51</b>	21	18	<b>39</b>	12	6	<b>18</b>

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp.	Remarks	Semester
MSE202	Introduction to Materials Science and Engineering 재료공학개론	○	○	○	3-3-0		1
MSE203	Physical Chemistry I: Thermodynamics 재료물리화학: 열역학	○	○	○	3-3-0		1
MSE230	Introduction to Crystallography 결정학개론	○	○	○	3-3-0	[PRE] MSE202	2
MSE290	Introduction to Computational Materials Science 전산재료과학개론	○	○		3-3-0		2
MSE300	Materials Lab 재료실험	○	○		3-1-4		2
MSE312	Phase Transformations in Materials 재료상변태	○	○	○	3-3-0		1
MSE354	Introduction to Semiconductor 반도체개론	○	○		3-3-0		1
<b>Total</b>		<b>21</b>	<b>21</b>	<b>12</b>			

\*Courses that are not required for Minor can be counted as Elective course

## ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
MSE204	Electromagnetics 전자기학	○	○	○	3-3-0		2
MSE211	Physical Chemistry of Materials II: Reaction Engineering 재료물리화학II: 반응공학	○	○	○	3-3-0		2
MSE250	Modern Physics of Materials: Quantum Mechanics 재료현대물리: 양자역학	○	○	○	3-3-0		2
MSE251	Surface Science of Materials 재료표면과학	○	○	○	3-3-0	[PRE] MSE202	1
MSE253	Introduction to Nanomaterials 나노재료개론	○	○	○	3-3-0		2
MSE270	Introduction to Polymer Materials 고분자재료개론	○	○	○	3-3-0		2
MSE304	Data Analytics for Materials Science and Engineering 재료공학 데이터 분석	○	○	○	3-3-0		2
MSE311	Introduction to Metallic Materials 금속재료개론	○	○	○	3-3-0		2
MSE313	Mechanical Behavior of Materials 재료의기계적거동	○	○	○	3-3-0		1
MSE315	Physical Properties of Materials 재료물성론	○	○	○	3-3-0		1
MSE330	Nano-Electrocermics 나노전자세라믹스	○	○	○	3-3-0		2
MSE350	Solid State Physics of Materials 재료고체물리	○	○	○	3-3-0		2
MSE351	Thin Film Technology 박막공학	○	○	○	3-3-0		1
MSE355	Nano-energy Materials 나노에너지재료	○	○	○	3-3-0		1
MSE356	Nanophotonics 나노포토닉스	○	○	○	3-3-0		2
MSE360	Bio-inspired Materials Science 바이오소재과학	○	○	○	3-3-0	[IDEN] BME235	2
MSE372	Polymer Physics 고분자 물리	○	○	○	3-3-0		2
MSE401	Transmission Electron Microscopy 전자현미경학	○	○	○	3-3-0		1
MSE405	Introduction to Crystal Growth 결정성장개론	○	○	○	3-3-0		1
MSE431	Introduction to Spintronics 스핀트로닉스개론	○	○	○	3-3-0		2
MSE432	Piezoelectric Materials 압전재료	○	○	○	3-3-0		1
MSE434	Microstructure-Property Relationships: Foundations in Physical Metallurgy 미세구조와 물성	○	○	○	3-3-0		1
MSE452	Semiconducting Devices 반도체소자	○	○	○	3-3-0		1
MSE453	Semiconductor Processing 반도체공정	○	○	○	3-3-0		2
MSE454	Nano-Materials Reliability 나노소재신뢰성	○	○	○	3-3-0		1
MSE455	Display Engineering 디스플레이공학	○	○	○	3-3-0		1

## Department of Materials Science and Engineering

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
MSE471	Polymer Composites 고분자복합재료	○	○	○	3-3-0		1
MSE491	Special Topics in Materials Science and Engineering I 신소재공학특론I	○	○	○	3-3-0		-
MSE492	Special Topics in Materials Science and Engineering II 신소재공학특론II	○	○	○	3-3-0		-
MSE493	Special Topics in Materials Science and Engineering III 신소재공학특론III	○	○	○	3-3-0		-
MSE494	Special Topics in Materials Science and Engineering IV 신소재공학특론IV	○	○	○	3-3-0		-
MEN230	Solid Mechanics I 고체역학 I	○	○	○	3-3-0		1
MEN301	Numerical Analysis 수치해석	○	○	○	3-2-2	[PRE] MTH201	2
MEN431	Introduction to Plastic Deformation 소성학개론	○	○	○	3-3-0	[PRE] MEN231	1
ECHE312	Electrochemistry 전기화학	○	○	○	3-3-0		1
EEE442	Semiconductor VLSI Devices Engineering 반도체집적소자공학	○	○	○	3-3-0	[PRE] EEE204, EEE304	2
BME211	Engineering Physiology 공학생리학	○	○	○	3-3-0		2
BIO201	Molecular Biology 분자생물학	○	○	○	3-3-0		2
BIO211	Biochemistry I 생화학 I	○	○	○	3-3-0		1
PHY201	Classical Mechanics 고전역학	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY301	Quantum Physics I 양자물리학	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY303	Thermal and Statistical Physics 열및통계물리학	○	○	○	3-3-0	[PRE] PHY301	2
PHY407	Semiconductor and Precision Measurement Physics 반도체및계측물리학	○	○	○	3-2-2		1
CHM211	Organic Chemistry I 유기화학 I	○	○	○	3-3-0	[IDEN] ECHE201	1,2
CHM291	Analytical Chemistry I 분석화학 I	○	○	○	3-3-0	[IDEN] ECHE213	1
CHM321	Biochemistry I 생화학 I	○	○	○	3-3-0	[IDEN] BIO211	1
CHM351	Inorganic Chemistry I 무기화학 I	○	○	○	3-3-0	[IDEN] ECHE304	1
<b>Total</b>		<b>141</b>	<b>141</b>	<b>141</b>			

※ [PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
AMS SE	AMS202, SCM202 Introduction to Materials Science and Engineering 재료공학개론		MSE202 Introduction to Materials Science and Engineering 재료공학개론
AMS SE	AMS203, SCM203 Physical Chemistry I: Thermodynamics 재료물리화학 I: 열역학		MSE203 Physical Chemistry I: Thermodynamics 재료물리화학 I: 열역학
AMS	AMS230 Introduction to Crystallography 결정학개론		MSE230 Introduction to Crystallography 결정학개론
AMS SE	AMS290, SCM290 Introduction to Computational Materials Science 전산재료과학개론		MSE290 Introduction to Computational Materials Science 전산재료과학개론
AMS SE	AMS300 Materials Lab 재료실험		MSE300 Materials Lab 재료실험
	SCM301 Semiconductor Lab 반도체실험		
AMS	AMS312 Phase Transformations in Materials 재료상변태		MSE312 Phase Transformations in Materials 재료상변태
SE	SCM354 Introduction to Semiconductor 반도체개론		MSE354 Introduction to Semiconductor 반도체개론
SE	SCM204 Electromagnetics 전자기학		MSE204 Electromagnetics 전자기학
AMS	AMS354 Physical Chemistry of Materials II: Reaction Engineering 재료물리화학 II: 반응공학	→	MSE211 Physical Chemistry of Materials II: Reaction Engineering 재료물리화학 II: 반응공학
AMS SE	AMS313, SCM313 Mechanical Behavior of Materials 재료의기계적거동		MSE313 Mechanical Behavior of Materials 재료의기계적거동
AMS SE	AMS250, SCM250 Modern Physics of Materials 재료현대물리		MSE250 (New) Modern Physics of Materials: Quantum Mechanics 재료현대물리: 양자역학
AMS	AMS353 Surface Science of Materials 재료표면과학		MSE251 Surface Science of Materials 재료표면과학
AMS	AMS311 Introduction to Metallic Materials 금속재료개론		MSE311 Introduction to Metallic Materials 금속재료개론
AMS	AMS433 Physical Ceramics 세라믹물성학		MSE315 Physical Properties of Materials 재료물성론
	AMS210 Defects in Crystals 결정결함론		
SE	SCM472 Flexible Electronics 유연전자소자		MSE330 Nano-Electroceramics 나노전자세라믹스
AMS SE	AMS350, SCM350 Solid State Physics of Materials 재료고체물리		MSE350 Solid State Physics of Materials 재료고체물리
SE	SCM351 Thin Film Technology 박막공학		MSE351 Thin Film Technology 박막공학

## Department of Materials Science and Engineering

Track	2020	→	2021
SE	SCM251 Introduction to Nanomaterials 나노재료개론		MSE253 Introduction to Nanomaterials 나노재료개론
SE	SCM355 Nano-energy Materials 나노에너지재료		MSE355 Nano-energy Materials 나노에너지재료
SE	SCM356 Nanophotonics 나노포토닉스		MSE356 Nanophotonics 나노포토닉스
AMS	AMS360 Bio-inspired Materials Science 바이오소재과학		MSE360 Bio-inspired Materials Science 바이오소재과학
AMS	AMS270 Introduction to Metallic Materials 고분자재료개론		MSE270 Introduction to Metallic Materials 고분자재료개론
AMS	AMS372 Polymer Physics 고분자물리		MSE372 Polymer Physics 고분자물리
AMS	AMS401 Transmission Electron Microscopy 전자현미경학		MSE401 Transmission Electron Microscopy 전자현미경학
AMS	AMS405 Introduction to Crystal Growth 결정성장개론		MSE405 Introduction to Crystal Growth 결정성장개론
AMS	AMS431 Magnetic Properties of Materials 재료의 자기적 성질		MSE431 Introduction to Spintronics 스핀트로닉스개론
AMS	AMS432 Piezoelectric Materials 압전재료		MSE432 Piezoelectric Materials 압전재료
SE	SCM452 Semiconducting Devices 반도체소자		MSE452 Semiconducting Devices 반도체소자
SE	SCM453 Semiconductor Processing 반도체공정		MSE453 Semiconductor Processing 반도체공정
AMS	AMS454 Nano-Materials Reliability 나노소재신뢰성		MSE454 Nano-Materials Reliability 나노소재신뢰성
SE	SCM455 Display Engineering 디스플레이공학		MSE455 Display Engineering 디스플레이공학
AMS	AMS471 Polymer Composites 고분자복합재료		MSE471 Polymer Composites 고분자복합재료
AMS SE	AMS491 Special Topics in Materials Science I 신소재공학특론I		MSE491 Special Topics in Materials Science and Engineering I 신소재공학특론 I
	SCM491 Special Topics in Semiconductor Materials Engineering I 반도체재료공학특론 I		
AMS SE	AMS492 Special Topics in Materials Science II 신소재공학특론II		MSE492 Special Topics in Materials Science and Engineering II 신소재공학특론 II
	SCM492 Special Topics in Semiconductor Materials Engineering II 반도체재료공학특론 II		

Track	2020	→	2021
AMS SE	AMS493 Special Topics in Materials Science III 신소재공학특론III	→	MSE493 Special Topics in Materials Science and Engineering III 신소재공학특론 III
	SCM493 Special Topics in Semiconductor Materials Engineering III 반도체재료공학특론 III		
AMS SE	AMS494 Special Topics in Materials Science IV 신소재공학특론IV	→	MSE494 Special Topics in Materials Science and Engineering IV 신소재공학특론 IV
	SCM494 Special Topics in Semiconductor Materials EngineeringIV 반도체재료공학특론IV		
SE	SCM321 Instrumental Analysis for Materials 재료분석기기		⟨Closed⟩

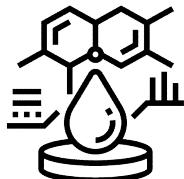
## 5. Curriculum Map [교육과정 이수 체계도]

1 <sup>st</sup> semester, Sophomore	2 <sup>nd</sup> semester, Sophomore	1 <sup>st</sup> semester, Junior	2 <sup>nd</sup> semester, Junior	1 <sup>st</sup> semester, Senior	2 <sup>nd</sup> semester, Senior
[MSE202] Introduction to Materials Science and Engineering 재료공학개론	[MSE390] Introduction to Computational Materials Science 전산재료과학개론	[MSE312] Phase Transformations in Materials 재료상변태	[MSE300] Materials Lab 재료실험	[MSE471] Polymer Composites 고분자복합재료	[MSE431] Introduction to Spintronics 스핀트로닉스개론
[MSE203] Physical Chemistry I: Thermodynamics 재료물리화학I: 열역학	[MSE230] Introduction to Crystallography 결정학개론	[MSE354] Introduction to Semiconductor 반도체개론	[MSE356] Nanophotonics 나노포토닉스	[MSE401] Transmission Electron Microscopy 전자현미경학	[MSE453] Semiconductor Processing 반도체공정
	[MSE253] Introduction to Nanomaterials 나노재료개론	[MSE313] Mechanical Behavior of Materials 재료의기계적거동	[MSE350] Solid State Physics of Materials 재료고체물리	[MSE455] Display Engineering 디스플레이공학	[MSE434] Microstructure –Property Relationships: Foundations in Physical Metallurgy 미세구조와물성
	[MSE270] Introduction to Polymer Materials 고분자재료개론	[MSE250] Modern Physics of Materials: Quantum Mechanics 재료현대물리·양자역학	[MSE360] Bio-inspired Materials Science 바이오소재과학	[MSE432] Piezoelectric Materials 압전재료	
	[MSE204] Electromagnetics 전자기학	[MSE351] Thin Film Technology 박막공학	[MSE372] Polymer Physics 고분자물리	[MSE454] Nano-Materials Reliability 나노소재신뢰성	
	[MSE211] Physical Chemistry of Materials II: Reaction Engineering 재료물리화학II: 반응공학	[MSE251] Surface Science of Materials 재료표면과학	[MSE311] Introduction to Metallic Materials 금속재료개론	[MSE452] Semiconducting Devices 반도체소자	
		[MSE355] Nano-energy Materials 나노에너지재료	[MSE302] Data Analytics for Materials Science and Engineering 재료공학데이터분석	[MSE330] Nano -Electrocermamics 나노전자세라믹스	
		[MSE315] Physical Properties of Materials 재료물성론		[MSE405] Introduction to Crystal Growth 결정성장개론	

# School of Energy and Chemical Engineering

## [에너지화학공학과]

### ■ School Introduction [학과소개]



The School of Energy and Chemical Engineering (ECHE) at UNIST aims to promote the growth of highly capable and motivated engineers who can address challenges not only in existing chemical processes but in globally emerging topics of energy and environment. By taking core courses of chemical engineering, such as transport phenomena and reactor design, students will gain a deep understanding of the chemical engineering principles, and learn how the principle applies to solving problems in the following areas: design and control of chemical processes, next-generation catalysis, novel functional materials and devices, biosystems and metabolic engineering, artificial intelligence, modeling and simulation of chemical processes, and energy harvesting and storage. Students will have opportunities to evaluate and clarify their career direction by taking laboratory courses and a research internship, both of which are carefully designed and advised by the faculty members in ECHE. Having close ties with leading research institutions and industry partners, both domestic and overseas, ECHE at UNIST also provides a well established academia-industry convergence research program in various fields.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 32 Credits
	Elective 선택[학과 지정]	15 5 mandatory courses designated by school –Calculus II, General Physics II, General Chemistry II, Differential Equations, Introduction to AI Programming II	
Major 전공	Required 필수	33 Refer to the required courses * Additional requirements for graduation 1) Choosing 2 experimental courses out of 6 2) Undergraduate Thesis Research	At least 51 Credits
	Elective 선택	18 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	14	All courses accepted	At least 14 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			15 credits	15 credits	15 credits
1	MTH112	Calculus II (3)	●	●	●
2	PHY103	General Physics II (3)	●	●	●
3	CHM102	General Chemistry II (3)	●	●	●
4	PHY108	General Physics Lab II (1)			
5	CHM106	General Chemistry Lab II (1)			
6	MTH201	Differential Equations (3)	●	●	●
7	MTH203	Applied Linear Algebra (3)			
8	MTH211	Statistics (3)			
9	MGT102	Entrepreneurship (3)			
10	IE101	Introduction to Data Science(3)			
11	ITP117	Introduction to AI Programming II (3)	●	●	●
12	ITP111	Probability & Random Process (3)			
13	ITP112	Discrete Mathematics (3)			
14	UNI104	Understanding Major (1) <b>Trends in Energy &amp; Chemical Engineering</b>			

●: Required ○: Elective ◉: Recommended, ( ): credits

※ Understanding Major 'Trends in Energy & Chemical Engineering (에너지화학공학 소개)' course is recommended to take as a free elective

※ School required fundamental courses should be completed before the Major Selection

## 3. Curriculum [에너지화학공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
School of Energy and Chemical Engineering	33	18	51	33	6	39	18	0	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Name	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
ECHE201	Organic Chemistry I 유기화학 I	○	○	○	3-3-0	[IDEN] CHM211	1
ECHE203	Physical Chemistry I 물리화학 I	○	○	○	3-3-0	[IDEN] CHM231	1
ECHE212	Introduction to Chemical Process 화학공정개론	○	○	○	3-3-0		1
ECHE223	Energy Materials Lab 에너지 재료실험	○	○		3-0-6		2
ECHE231	Chemical Engineering Thermodynamics 화공열역학	○	○	○	3-3-0		2
ECHE302	Advanced Chemical Engineering Lab 첨단화학공학실험	○	○		3-0-6		1
ECHE311	Chemical Reaction Engineering 반응공학	○	○	○	3-3-0		2

School of Energy and Chemical Engineering

Course Code	Course Name	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
ECHE331	Transport Phenomena: Momentum, Heat, and Mass Transfer 전달현상: 운동량, 열, 물질전달	○	○	○	3-3-0	[PRE] Required: MTH201 and Choose one among following courses: ECHE203, ECHE231, MEN210, MEN211, UEE324, MSE203, NE331, CHM336	1
ECHE314	Energy Conversion and Storage Lab 에너지변환 및 저장실험	○	○		3-0-6		2
ECHE323	Solar Cells Lab 태양전지실험	○	○		3-0-6		1
ECHE341	Engineering Biology Lab 생물화학공학실험	○	○		3-0-6		2
ECHE351	Introduction to Polymer Science and Engineering 고분자과학개론	○	○		3-3-0	[PRE] ECHE201 [IDEN] CHM372, MSE270	1
ECHE352	Advanced Fluid Mechanics 고급유체역학	○	○		3-3-0		2
ECHE361	Organic/Physical Chemistry Lab 유기물리화학실험	○	○		3-0-6		2
ECHE490	Undergraduate Thesis Research 학사졸업논문연구	○	○		3-0-6		1,2
<b>Total</b>		<b>45</b>	<b>45</b>	<b>18</b>			

\*Courses that are not required for Minor can be counted as Elective course

### ▶ Elective [전공선택]

Course Code	Course Name	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
ECHE202	Organic Chemistry II 유기화학 II	○	○		3-3-0	[IDEN] CHM212	2
ECHE213	Analytical Chemistry 분석화학	○	○		3-3-0	[IDEN] CHM291	1
ECHE218	Fundamentals of Energy Conversion Systems 에너지 변환 시스템 개론	○	○		3-3-0		2
ECHE222	Physical Chemistry II: Kinetics 물리화학 II: 동역학	○	○		3-3-0		2
ECHE240	Engineering Biochemistry 공학생화학	○	○		3-3-0		2
ECHE241	Fundamentals of Engineering Biology 공학생물학	○	○		3-3-0		1
ECHE242	Machine Learning for Chemical Engineering 화학공학 머신러닝	○	○		3-3-0		1
ECHE301	Computational Methods for Chemical Engineering 화학공학전산	○	○		3-3-0		2
ECHE304	Inorganic Chemistry I 무기화학 I	○	○		3-3-0	[IDEN] CHM351	1
ECHE312	Electrochemistry 전기화학	○	○		3-3-0		1
ECHE313	Solid State Chemistry 고체화학	○	○		3-3-0	[PRE] Required: ECHE203 and Choose one among following courses: ECHE311 or ECHE222 [IDEN] CHM454	1

Course Code	Course Name	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
ECHE316	Electronic Devices 전자소자	○	○		3-3-0		1
ECHE317	Fundamentals of Energy Materials 에너지재료개론	○	○		3-3-0	[IDEN] CHM313	1
ECHE320	Electrocatalysis 전기화학 촉매반응	○	○		3-3-0		1
ECHE321	Polymer Material Science 고분자재료과학	○	○		3-3-0	[PRE] ECHE351	2
ECHE322	Instrumental Analysis 기기분석	○	○		3-3-0	[IDEN] CHM391	2
ECHE324	Computational Materials Science 전산재료과학	○	○		3-3-0		2
ECHE326	Inorganic Chemistry II 무기화학 II	○	○		3-3-0	[IDEN] CHM352	2
ECHE340	Biochemical Engineering 생물화학공학	○	○		3-3-0		1
ECHE402	Separation Process 분리공정	○	○		3-3-0		1
ECHE410	Phase Transformation 재료상변태	○	○		3-3-0		2
ECHE412	Principle of Solution Processing 용액공정개론	○	○		3-3-0		2
ECHE413	Introduction to New Energy Conversion and Storage 신에너지 변환 및 저장개론	○	○		3-3-0		2
ECHE416	Introduction to Nanoscience and Nanotechnology 나노과학 및 기술	○	○		3-3-0	[IDEN] CHM371	1
ECHE420	Fundamentals of Energy Organic Materials 에너지유기재료개론	○	○		3-3-0		1
ECHE421	Fundamentals of Semiconductor Fabrication 반도체공정개론	○	○		3-3-0		2
ECHE422	Fundamentals of Electrochemical System 전기화학시스템개론	○	○		3-3-0	[PRE] ECHE203	1
ECHE423	Introduction to Application Technologies of Energy Devices: ESS &EV 에너지기기응용기술개론: ESS & EV	○	○		3-3-0		1
ECHE431	Introduction to Catalysis 촉매개론	○	○		3-3-0		2
ECHE432	Chemical Engineering Mathematics 화공수학	○	○		3-3-0		2
ECHE441	Introduction to Molecular Biotechnology 분자생물공학	○	○		3-3-0		2
ECHE442	Chemical Process Design and Economics 공정설계 및 경제성	○	○		3-3-0		2
ECHE443	Chemical Process Control 공정제어	○	○		3-3-0		1,2
ECHE450	Special Topics in Energy and Chemical Engineering I 에너지화학공학 특론 I	○	○		3-3-0		-
ECHE451	Special Topics in Energy and Chemical Engineering II 에너지화학공학 특론 II	○	○		3-3-0		-
ECHE452	Special Topics in Energy and Chemical Engineering III 에너지화학공학 특론 III	○	○		3-3-0		-
ECHE453	Special Topics in Energy and Chemical Engineering IV 에너지화학공학 특론 IV	○	○		3-3-0		-
ECHE454	Special Topics in Energy and Chemical Engineering V 에너지화학공학 특론 V	○	○		3-3-0		-

Course Code	Course Name	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
UEE206	Science Humanities 과학인문학	○	○		3-3-0		-
MSE351	Thin Film Technology 박막공학	○	○		3-3-0		1
MSE452	Semiconducting Devices 반도체소자	○	○		3-3-0		1
MSE455	Nano-Materials Reliability 나노소재신뢰성	○	○		3-3-0		1
CHM232	Physical Chemistry II 물리화학 II	○	○		3-3-0		2
CHM291	Analytical Chemistry I 분석화학 I	○	○		3-3-0		1
CHM333	Physical Chemistry III 물리화학 III	○	○		3-3-0		1
<b>Total</b>		<b>135</b>	<b>135</b>	-			

※ [PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

### ※ Identical Courses [동일지정교과]

School	Identical Course 1	↔	Department	Identical Course 2
Energy and Chemical Engineering	ECHE201 Organic Chemistry I 유기화학 I	↔	Chemistry	CHM211 Organic Chemistry I 유기화학1
	ECHE202 Organic Chemistry II 유기화학II			CHM212 Organic Chemistry II 유기화학2
	ECHE203 Physical Chemistry I 물리화학1			CHM231 Physical Chemistry I 물리화학1
	ECHE213 Analytical Chemistry 분석화학			CHM291 Analytical Chemistry I 분석화학I
	ECHE304 Inorganic Chemistry I 무기화학 I			CHM351 Inorganic Chemistry I 무기화학I
	ECHE313 Solid State Chemistry 고체화학			CHM454 Solid State Chemistry 고체화학
	ECHE317 Fundamentals of Energy Materials 에너지재료개론			CHM313 Fundamentals of Energy Materials 에너지재료개론
	ECHE322 Instrumental Analysis 기기분석			CHM391 Instrumental Analysis 기기분석
	ECHE326 Inorganic Chemistry II 무기화학2			CHM352 Inorganic Chemistry II 무기화학2
	ECHE416 Introduction to Nanoscience and Nanotechnology 나노과학 및 기술			CHM371 Introduction to Nanochemistry 나노화학개론
	ECHE351 Introduction to Polymer Science and Engineering 고분자과학개론		Chemistry	CHM372 Introduction to Polymer Chemistry 고분자화학개론
			Materials Science and Engineering	MSE270 Introduction to Polymer Materials 고분자재료개론

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
ACE ENE	ACE201, ENE211 Organic Chemistry I 유기화학 I		ECHE201 Organic Chemistry I 유기화학 I
ACE ENE	ACE203, ENE212 Physical Chemistry I 물리화학 I		ECHE203 Physical Chemistry I 물리화학 I
ACE	ACE212 Introduction to Chemical Process 화학공정개론		ECHE212 Introduction to Chemical Process 화학공정개론
ACE	ACE231 Chemical Engineering Thermodynamics 화공열역학		ECHE231 Chemical Engineering Thermodynamics 화공열역학
ENE	ACE311 Chemical Reaction Engineering 반응공학		ECHE311 Chemical Reaction Engineering 반응공학
ENE	ACE331 Transport Phenomena : Momentum, Heat, and Mass Transfer 전달현상: 운동량, 열, 물질전달		ECHE331 Transport Phenomena : Momentum, Heat, and Mass Transfer 전달현상: 운동량, 열, 물질전달
ACE ENE	ACE351, ENE226 Introduction to Polymer Science and Engineering 고분자과학개론		ECHE351 Introduction to Polymer Science and Engineering 고분자과학개론
ACE	ACE332 Advanced Fluid Mechanics 고급유체역학		ECHE352 Advanced Fluid Mechanics 고급유체역학
ENE	ENE223 Lab for Energy Materials 에너지재료실험		ECHE223 Energy Materials Lab 에너지재료실험
ACE	ACE302 Advanced Chemical Engineering Lab 첨단화학공학실험		ECHE302 Advanced Chemical Engineering Lab 첨단화학공학실험
ENE	ENE314 Energy Conversion and Storage Lab 에너지변환 및 저장실험		ECHE314 Energy Conversion and Storage Lab 에너지변환 및 저장실험
ENE	ENE323 Solar Cells Lab 태양전지실험		ECHE323 Solar Cells Lab 태양전지실험
ACE	ACE341 Engineering Biology Laboratory 생물화학공학실험		ECHE341 Engineering Biology Lab 생물화학공학실험
ACE	ACE361 Organic/Physical Chemistry Lab 유기물리화학실험		ECHE361 Organic/Physical Chemistry Lab 유기물리화학실험
ACE ENE	ACE202, ENE221 Organic Chemistry II 유기화학 II		ECHE202 Organic Chemistry II 유기화학 II
ENE	ENE213 Analytical Chemistry 분석화학		ECHE213 Analytical Chemistry 분석화학
ENE	ENE218 Fundamentals of Energy Conversion Systems 에너지변환시스템개론		ECHE218 Fundamentals of Energy Conversion Systems 에너지변환시스템개론
ENE	ENE222 Physical Chemistry II: Kinetics 물리화학II: 동역학		ECHE222 Physical Chemistry II: Kinetics 물리화학II: 동역학
ACE	ACE240 Engineering Biochemistry 공학생화학		ECHE240 Engineering Biochemistry 공학생화학

Track	2020	→	2021
ACE	ACE241 Fundamentals in Engineering Biology 공학생물학		ECHE241 Fundamentals of Engineering Biology 공학생물학
ACE	ACE242 Machine Learning for Chemical Engineering 화학공학머신러닝		ECHE242 Machine Learning for Chemical Engineering 화학공학머신러닝
ACE	ACE301 Computational Methods for Chemical Engineering 화학공학전산		ECHE301 Computational Methods for Chemical Engineering 화학공학전산
ACE ENE	ENE311, ACE304 Inorganic Chemistry I 무기화학 I		ECHE304 Inorganic Chemistry I 무기화학 I
ACE ENE	ENE312, ACE312 Electrochemistry 전기화학		ECHE312 Electrochemistry 전기화학
ACE ENE	ENE313, ACE321 Solid State Chemistry 고체화학		ECHE313 Solid State Chemistry 고체화학
ENE	ENE316 Electronic Devices 전자소자		ECHE316 Electronic Devices 전자소자
ENE	ENE317 Fundamentals of Energy Materials 에너지재료개론		ECHE317 Fundamentals of Energy Materials 에너지재료개론
ACE ENE	ENE321 Polymer Material Science 고분자재료과학		ECHE321 Polymer Material Science 고분자재료과학
	ACE352 Polymer Materials 고분자재료	→	
ACE ENE	ACE391, ENE322 Instrumental Analysis 기기분석		ECHE322 Instrumental Analysis 기기분석
ACE ENE	ACE326, ENE326 Inorganic Chemistry II 무기화학 II		ECHE326 Inorganic Chemistry II 무기화학 II
ACE	ACE340 Biochemical Engineering 생물화학공학		ECHE340 Biochemical Engineering 생물화학공학
ENE	ENE410 Phase Transformation 재료상변태		ECHE410 Phase Transformation 재료상변태
ENE	ENE412 Principle of Solution Processing 용액공정개론		ECHE412 Principle of Solution Processing 용액공정개론
ENE	ENE413 Introduction to New Energy Conversion and Storage 신에너지 변환 및 저장개론		ECHE413 Introduction to New Energy Conversion and Storage 신에너지 변환 및 저장개론
ACE ENE	ENE416 Introduction to Nanoscience and Nanotechnology 나노과학 및 기술		ECHE416 Introduction to Nanoscience and Nanotechnology 나노과학 및 기술
	ACE416 Nanomaterials Chemistry 나노재료화학	→	
ENE	ENE420 Fundamentals of Energy Organic Materials 에너지유기재료개론		ECHE420 Fundamentals of Energy Organic Materials 에너지유기재료개론
ENE	ENE421 Fundamentals of Semiconductor Fabrication 반도체공정개론		ECHE421 Fundamentals of Semiconductor Fabrication 반도체공정개론
ENE	ENE422 Fundamentals of Electrochemical System 전기화학시스템개론		ECHE422 Fundamentals of Electrochemical System 전기화학시스템개론

Track	2020	→	2021
ENE	ENE423 Introduction to Application Technologies of Energy Devices: ESS & EV 에너지기기응용기술개론: ESS & EV	→	ECHE423 Introduction to Application Technologies of Energy Devices: ESS & EV 에너지기기응용기술개론: ESS & EV
ACE	ACE431 Introduction to Catalysis 촉매개론		ECHE431 Introduction to Catalysis 촉매개론
ACE	ACE432 Chemical Engineering Mathematics 화공수학		ECHE432 Chemical Engineering Mathematics 화공수학
ACE	ACE441 Introduction to Molecular Biotechnology 분자생물공학		ECHE441 Introduction to Molecular Biotechnology 분자생물공학
ENE	ENE216 Fundamentals of Materials Science 재료과학개론		⟨Closed⟩
ENE	ENE319 Physical Chemistry III: Quantum Mechanics 물리화학 III: 양자역학		⟨Closed⟩
ENE	ENE327 Solid State Chemistry II 고체화학 II		⟨Closed⟩
ENE	ENE414 Surface Analytical Chemistry 표면분석화학		⟨Closed⟩
ENE	ENE415 Solid State Physics 고체물리학		⟨Closed⟩

\*Students affiliated in previous ACE and ENE track can take newly opened course in department of ECHE and the course can be counted as required or elective (refer to each year curriculum)

## 5. Curriculum Map [교육과정 이수 체계도]

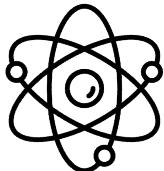
1 <sup>st</sup> semester, Sophomore	2 <sup>nd</sup> semester, Sophomore	1 <sup>st</sup> semester, Junior	2 <sup>nd</sup> semester, Junior	1 <sup>st</sup> semester, Senior	2 <sup>nd</sup> semester, Senior
[ECHE201] Organic Chemistry I 유기화학 I	[ECHE231] Chemical Eng. Thermodynamics 화공열역학	[ECHE331] Transport Phenomena 전달현상	[ECHE311] Chemical Reaction Eng. 반응공학	-	[ECHE490] Undergrad. Thesis Research 학사졸업논문연구
[ECHE203] Physical Chemistry I 물리화학 I	[ECHE223] Energy Materials Lab 에너지재료실험	[ECHE351] Intro to Polymer Science and Eng. 고분자과학개론	[ECHE352] Advanced Fluid Mechanics 고급유체역학	-	-
[ECHE212] Intro to Chemical Process 화학공정개론		[ECHE302] Advanced Chemical Eng. Lab 첨단화학공학실험	[ECHE361] Organic/Physical Chemistry Lab 유기물리화학실험	-	-
[ECHE314] Energy Conversion and Storage Lab 에너지변환 및 저장실험		[ECHE323] Solar Cells Lab 태양전지실험	[ECHE341] Eng. Biology Lab 생물화학공학실험	-	-

\* You should choose 2“Lab” courses out of total 6 for graduation, so the “Lab” courses written above table could be optional.

# Department of Nuclear Engineering

## [원자력공학과]

### ■ Department Introduction [학과소개]



Nuclear Science and Engineering is comprised of various science and engineering branches, such as nuclear reactor physics, radiation engineering, nuclear safety engineering, thermohydraulics, nuclear materials engineering, radiation material science, nuclear fuel cycle engineering, health physics, nuclear policy, nuclear material safeguards and non-proliferation, nuclear power plant decontamination and decommissioning, and nuclear fusion science and engineering. The Track of Nuclear Science and Engineering currently has 10 faculty members and provides a variety of courses covering almost all the branches of nuclear science and engineering abovementioned. The thoroughness of our program will promote students to be fully qualified nuclear scientists and engineers who can compete globally.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 30 Credits
	Elective 선택[학과 지정]	13 Complete at least 13 credits including Applied Linear Algebra(3), Differential Equations(3), Calculus II(3) and Statistics(3)	
Major 전공	Required 필수	33 Refer to Required course list below Graduation thesis required(No credits for thesis)	At least 54 Credits
	Elective 선택	21 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	13 All courses acceptable		At least 13 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 credits	6 credits	-
1	MTH112	Calculus II (3)	●		
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	●	●	
7	MTH203	Applied Linear Algebra (3)	●	●	
8	MTH211	Statistics (3)	●		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
11	ITP111	Probability & Random Process (3)	○		
12	ITP112	Discrete Mathematics (3)	○		
14	UNI105	Understanding Major (1) The Future of Nuclear Engineering	○		

●: Required ○: Elective ◉: Recommended, ( ) : credits

\* It is recommended to take 'The future of Nuclear Engineering' course for double major

## 3. Curriculum [원자력공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Nuclear Engineering	33	21	54	15	21	36	3	15	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double <sup>1)</sup>	Minor	Cred -Lect -Exp	Remark	Seme ster
NE200	Fundamentals of Nuclear Engineering 원자력공학개론	○	○	○	3-3-0		1
NE210	Nuclear Radiation Engineering&Experiment 원자력방사선공학 및 실험	○	○		3-2-2		2
NE220	Nuclear Materials Engineering & Experiment 원자력재료공학 및 실험	○	○		3-2-2		2
NE300	Introduction to Nuclear Reactor Theory 원자로이론 개론	○	○		3-3-0		2
NE310	Nuclear System Engineering & Experiment 원자로계통공학 및 실험	○	○		3-2-2		2
NE320	Introduction to Nuclear Reliability Engineering 신뢰도 공학 개론	○			3-3-0		1
NE340	Introduction to Nuclear Fuel Cycle Engineering 핵연료주기공학 개론	○	○		3-3-0		1
NE350	Fundamentals of Plasma Physics 플라즈마 물리학 기초	○	○		3-3-0	[PRE] NE250 [IDEN] PHY427	1

Course Code	Course Title	Major	Double <sup>1)</sup>	Minor	Cred -Lect -Exp	Remark	Semester
NE400	Fundamentals of Nuclear Fusion 핵융합개론	○	○		3-3-0		1
NE410	Power Plant Systems 원전시스템	○			3-3-0		1
NE420	Introduction to Nuclear Engineering IT 원자력 IT 개론	○			3-2-2		2
NE490	Graduation Thesis 졸업논문	○			0 credit		1,2
	Total	33	24	3			

1) Double Major: Take 5 courses(15 credits) among 8 courses (Fundamentals of Nuclear Engineering, Nuclear Radiation Engineering & Experiment, Nuclear Materials Engineering & Experiment, Introduction to Nuclear Reactor Theory, Nuclear System Engineering & Experiment, Introduction to Nuclear Fuel Cycle Engineering, Fundamentals of Plasma Physics, Fundamentals of Nuclear Fusion)

1) 복수전공은 원자력공학개론, 원자력방사선공학 및 실험, 원자력재료공학 및 실험, 원자로이론 개론, 원자로계통공학 및 실험, 핵연료주기공학 개론, 플라즈마 물리학 기초, 핵융합개론 중 5개(15학점) 이수

\* Courses that are not required for Minor/Double Major can be counted as Elective course

\* 복수전공자, 부전공자에게 필수로 인정되지 않는 전공필수 과목을 이수했을 경우 선택으로 인정가능

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
NE240	Nuclear Chemical Engineering 원자력화학공학	○	○	○	3-3-0		1
NE250	Fundamentals of Electromagnetics 전자기학개론	○	○	○	3-3-0		1
NE251	Scientific Computation in Nuclear Fusion 전신핵융합기초	○	○	○	3-3-0		2
NE301	Nuclear Reactor Numerical Analysis 원자로 수치해석	○	○	○	3-3-0		1
NE330	Nuclear Fuel Engineering & Experiment 핵연료공학 및 실험	○	○	○	3-2-2		1
NE331	Thermodynamics and Metallurgy of Nuclear Materials 원자력재료열역학	○	○	○	3-3-0		2
NE341	Radioactive Waste Management 방사성폐기물관리	○	○	○	3-3-0		1
NE351	Introduction to Perturbation Methods 섭동방법론기초	○	○	○	3-3-0		1
NE391	Nuclear Engineering Design and Lab I 원자력공학종합설계프로젝트 I	○	○	○	2-0-4		1
NE392	Nuclear Engineering Design and Lab II 원자력공학종합설계프로젝트 II	○	○	○	2-0-4		2
NE393	Nuclear Engineering Design and Lab III 원자력공학종합설계프로젝트 III	○	○	○	2-0-4		2
NE401	Nuclear Reactor Lab 원자로실험	○	○	○	3-0-6		-
NE430	Introduction to Radiation Materials Science 방사선 재료 과학 개론	○	○	○	3-3-0		2
NE440	Instrumentation and Control Systems 원전계측제어시스템	○	○	○	3-3-0		2
NE491	Special Topics on Nuclear Engineering and Science I 원자력공학 및 과학 특론 I	○	○	○	3-3-0		-
NE492	Special Topics on Nuclear Engineering and Science II 원자력공학 및 과학 특론 II	○	○	○	3-3-0		-

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
NE493	Special Topics on Nuclear Engineering and Science III 원자력공학 및 과학 특론 III	○	○	○	3-3-0		-
NE494	Special Topics on Nuclear Engineering and Science IV 원자력공학 및 과학 특론 IV	○	○	○	3-3-0		-
MEN210	Thermodynamics 열역학	○	○		3-3-0		1
MEN211	Applied Thermodynamics 응용열역학	○	○		3-3-0		2
MEN220	Fluid Mechanics 유체역학	○	○		3-3-0		2
MEN231	Solid Mechanics I 고체역학 I	○	○		3-3-0	[PRE] MEN230	2
MEN270	Dynamics 동역학	○	○		3-3-0		2
MEN301	Numerical Analysis 수치해석	○	○		3-2-2	[PRE] MTH201	2
MEN310	Heat Transfer 열전달	○	○		3-3-0	[PRE] MEN210, MEN220	1
MEN320	Applied Fluid Mechanics 응용유체역학	○	○		3-3-0	[PRE] MEN220	1
MEN457	Introduction to Electric-Electronic Engineering 전기전자공학개론	○	○		3-3-0	[PRE] PHY103	1
ECHE203	Physical Chemistry I 물리화학 I	○	○		3-3-0	[IDEN] CHM231	1
ECHE322	Instrumental Analysis 기기분석	○	○		3-3-0	[IDEN] ECHE351	2
ECHE416	Introduction to Nanoscience and Nanotechnology 나노과학 및 기술	○	○		3-3-0	[IDEN] CHM371	1
MSE202	Introduction to Materials Science and Engineering 재료공학개론	○	○		3-3-0		1
MSE203	Physical Chemistry I: Thermodynamics 재료물리화학 I: 열역학	○	○		3-3-0		1
PHY204	Electromagnetism II 전자기학 II	○	○		3-3-0	[PRE] PHY203	2
PHY301	Quantum Physics I 양자물리학 I	○	○		3-3-0	[PRE] PHY101, PHY103	1
PHY303	Thermal and Statistical Physics I 열 및 통계물리학 I	○	○		3-3-0	[PRE] PHY301	2
PHY315	Solid State Physics I 고체물리학 I	○	○		3-3-0	[PRE] PHY301	2
<b>Total</b>		<b>108</b>	<b>108</b>	<b>54</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

\* Students affiliated in previous NUE, NSE track can take newly opened course from the department of Nuclear Engineering and those courses can be counted as required or elective according to the year that took the course.

\* 기존 NUE, NSE트랙 학생들은 원자력공학과에서 신규 추가된 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음

#### 4. Curriculum Change [교육과정 변경사항]

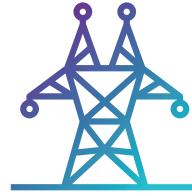
Track	2020	→	2021
NSE	NSE213 (Required) Fundamentals of Nuclear Engineering 원자력공학개론	→	NE200 (Required) Fundamentals of Nuclear Engineering 원자력공학개론
	NSE221 (Required) Nuclear Radiation Engineering&Experiment 원자력방사선공학 및 실험		NE210 (Required) Nuclear Radiation Engineering&Experiment 원자력방사선공학 및 실험
	NSE222 (Required) Nuclear Materials Engineering&Experiment 원자력재료공학 및 실험		NE220 (Required) Nuclear Materials Engineering&Experiment 원자력재료공학 및 실험
	NSE311 (Required) Introduction to Nuclear Reactor Theory 원자로이론 개론		NE300 (Required) Introduction to Nuclear Reactor Theory 원자로이론 개론
	NSE325 (Required) Nuclear System Engineering & Experiment 원자로계통공학 및 실험		NE310 (Required) Nuclear System Engineering & Experiment 원자로계통공학 및 실험
	NSE312 (Required) Introduction to Nuclear Reliability Engineering 신뢰도 공학 개론		NE320 (Required) Introduction to Nuclear Reliability Engineering 신뢰도 공학 개론
	NSE214 (Required) Introduction to Nuclear Fuel Cycle Engineering 핵주기공학 개론		NE340 (Required) Introduction to Nuclear Fuel Cycle Engineering 핵연료주기공학 개론
	NSE330 (Required) Fundamentals of Plasma Physics 플라즈마 물리학 기초		NE350 (Required) Fundamentals of Plasma Physics 플라즈마 물리학 기초
	NSE427 (Required) Fundamentals of Nuclear Fusion 핵융합개론		NE400 (Required) Fundamentals of Nuclear Fusion 핵융합개론
	NSE457 (Required) Principles of Nuclear Safety Design 원자력 안전 설계 원리		NE410 (Required) Power Plant Systems 원전시스템
	NSE480 (Required) Introduction to Nuclear Engineering IT 원자력 IT 개론		NE420 (Required) Introduction to Nuclear Engineering IT 원자력 IT 개론
	NSE223 (Required) Nuclear Chemical Engineering 원자력화학공학		NE240 (Elective) Nuclear Chemical Engineering 원자력화학공학
	NSE216 (Elective) Fundamentals of Electromagnetics 전자기학개론		NE250 (Elective) Fundamentals of Electromagnetics 전자기학개론
	NSE250 (Elective) Scientific Computation in Nuclear Fusion 전산핵융합기초		NE251 (Elective) Scientific Computation in Nuclear Fusion 전산핵융합기초
	NSE326 (Elective) Nuclear Reactor Numerical Analysis 원자로 수치해석		NE301 (Elective) Nuclear Reactor Numerical Analysis 원자로 수치해석
	NSE313 (Required) Nuclear Fuel Engineering & Experiment 핵연료공학 및 실험		NE330 (Elective) Nuclear Fuel Engineering & Experiment 핵연료공학 및 실험
	NSE316 (Elective) Thermodynamics and Metallurgy of Nuclear Materials 원자력재료열역학		NE331 (Elective) Thermodynamics and Metallurgy of Nuclear Materials 원자력재료열역학
	NSE327 (Elective) Radioactive Waste Management 방사성폐기물관리		NE341 (Elective) Radioactive Waste Management 방사성폐기물관리
	NSE350 (Elective) Introduction to Perturbation Methods 설동방법론기초		NE351 (Elective) Introduction to Perturbation Methods 설동방법론기초

Track	2020	→	2021
NSE	NSE318 (Elective) Nuclear Engineering Design and Lab I 원자력공학종합설계프로젝트 I	→	NE391 (Elective) Nuclear Engineering Design and Lab I 원자력공학종합설계프로젝트 I
	NSE328 (Elective) Nuclear Engineering Design and Lab II 원자력공학종합설계프로젝트 II		NE392 (Elective) Nuclear Engineering Design and Lab II 원자력공학종합설계프로젝트 II
	NSE329 (Elective) Nuclear Engineering Design and Lab III 원자력공학종합설계프로젝트 III		NE393 (Elective) Nuclear Engineering Design and Lab III 원자력공학종합설계프로젝트 III
	NSE421 (Required) Nuclear Reactor Lab 원자로실험		NE401 (Elective) Nuclear Reactor Lab 원자로실험
	NSE411 (Required) Introduction to Radiation Materials Science 방사선 재료 과학 개론		NE430 (Elective) Introduction to Radiation Materials Science 방사선 재료 과학 개론
	NSE426 (Elective) Instrumentation and Control Systems 원전계측제어시스템		NE440 (Elective) Instrumentation and Control Systems 원전계측제어시스템
	NSE400 (Elective) Special Topics on Nuclear Engineering and Science I 원자력공학 및 과학 특론 I		NE491 (Elective) Special Topics on Nuclear Engineering and Science I 원자력공학 및 과학 특론 I
	NSE401 (Elective) Special Topics on Nuclear Engineering and Science II 원자력공학 및 과학 특론 II		NE492 (Elective) Special Topics on Nuclear Engineering and Science II 원자력공학 및 과학 특론 II
	NSE402 (Elective) Special Topics on Nuclear Engineering and Science III 원자력공학 및 과학 특론 III		NE493 (Elective) Special Topics on Nuclear Engineering and Science III 원자력공학 및 과학 특론 III
	NSE403 (Elective) Special Topics on Nuclear Engineering and Science IV 원자력공학 및 과학 특론 IV		NE494 (Elective) Special Topics on Nuclear Engineering and Science IV 원자력공학 및 과학 특론 IV
	NSE404 (Elective) Special Topics on Nuclear Engineering and Science V 원자력공학 및 과학 특론 V		⟨Closed⟩
	NSE351 (Elective) Introduction to Plasma Kinetic Theory and Nonlinear Physics 플라즈마 운동 이론 기초		⟨Closed⟩
	NSE317 (Elective) Basic MHD Renewable Energy Engineering 전자기 신재생 에너지공학 기초 ⟨폐지 Abolished⟩		NE350 (Required) Fundamentals of Plasma Physics 플라즈마 물리학 기초 ⟨대체과목 Substitution⟩
	NSE416 (Elective) Nuclear Engineering Design and Lab IV 원자력공학종합설계프로젝트 IV ⟨폐지 Abolished⟩		NE330 (Elective) Nuclear Fuel Engineering & Experiment 핵연료공학 및 실험 ⟨대체과목 Substitution⟩

Department of Nuclear Engineering

## 5. Curriculum Map [교육과정 이수 체계도]

Sophomore		Junior		Senior	
1 <sup>st</sup> semester	2 <sup>nd</sup> semester	1 <sup>st</sup> semester	2 <sup>nd</sup> semester	1 <sup>st</sup> semester	2 <sup>nd</sup> semester
(NE200) Fundamentals in Nuclear Engineering	(NE210) Nuclear Radiation Engineering & Experiment	(NE300) Introduction to Nuclear Reactor Theory	(NE310) Nuclear System Engineering & Experiment	(NE400) Fundamentals of Nuclear Fusion	(NE420) Introduction to Nuclear Engineering IT
(NE240) Nuclear Chemical Engineering	(NE220) Nuclear Materials Engineering & Experiment	(NE340) Nuclear Fuel Engineering & Experiment	(NE320) Introduction to Nuclear Reliability Engineering	(NE401) Nuclear Reactor Lab	(NE410) Power Plant Systems
(NE250) Fundamentals of Electromagnetics	(NE251) Scientific Computation in Nuclear Fusion	(NE350) Fundamentals of Plasma Physics	(NE301) Nuclear Reactor Numerical Analysis	(NE430) Introduction to Radiation Materials Science	(NE440) Instrumentation and Control Systems
		(NE330) Nuclear Fuel Engineering & Experiment	(NE331) Thermodynamics and Metallurgy of Nuclear Materials		
		(NE341) Radioactive Waste Management	(NE351) Introduction to Perturbation Methods		



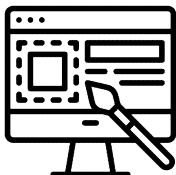
# **College of Info-Bio Convergence Engineering**

## **[정보바이오융합대학]**

# Department of Design

## [디자인학과]

### ■ Department Introduction [학과소개]



The goal of the Department of Design is to foster creative designers who can lead the innovative design of product and product-service systems. We will provide interdisciplinary courses on design knowledge, methods and techniques, including problem definition, user and market analysis, needs finding, creative idea generation, form and function development, design engineering, prototyping and business start-up. Students majoring in Design will play an essential role as integrative design thinkers and practitioners in future society, leading positive and innovative change in our society by employing user-centered design and research methods to drive the design and development of innovative design interventions.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 30 Credits
	Elective 선택[학과 지정]	13 Take 13 credits among the basic course list Recommended: 2 courses Elective: 11 courses	
Major 전공	Required 필수	30 Refer to Required course list below	At least 48 Credits
	Elective 선택	18 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	19	All courses accepted	At least 19 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 Credits	-	-
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	○		
7	MTH203	Applied Linear Algebra (3)	○		
8	MTH211	Statistics (3)	●		
9	MGT102	Entrepreneurship (3)	●		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI106	Understanding Major (1) What is Design?	●		

●: Required ○: Elective ●: Recommended, ( ): credits

\*It is recommended to take the above Major recommended courses for Double major/Minor students.

## 3. Curriculum [디자인학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Design	30	18	48	30	6	36	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
DES201	Design Elements and Principles 디자인요소와 원리	○	○	○	3-2-2		1
DES202	Product Design Fundamentals 제품디자인기초	○	○	○	3-2-2	[PRE] DES201	2
DES206	Design Visualization 디자인 시각화	○	○	○	3-2-2		1
DES232	3D CAD 3D CAD	○	○	○	3-2-2		2
DES301	Product Design I 제품디자인 I	○	○	-	3-2-2	[PRE] DES202	1
DES302	Product Design II 제품디자인 II	○	○	-	3-2-2	[PRE] DES301	2

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Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
DES332	UX design research methods UX 디자인 연구 방법	○	○	-	3-3-0		2
DES405	Design Communication 디자인 커뮤니케이션	○	○	-	3-2-2		1
DES431*	Creative Design 1 창의디자인 1	○	○	-	3-2-2	[PRE] DES302	1
DES432*	Creative Design 2 창의디자인 2	○	○	-	3-2-2	[PRE] DES431	2
<b>Total</b>		<b>30</b>	<b>30</b>	<b>12</b>			

\* Students who choose Design as their major or Double major are required to take both 'Creative Design 1(DES431)' and 'Creative Design 2 (DES432)' before graduation.

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
DES221	Design History & Contexts 디자인 역사와 맥락	○	○	○	3-3-0		1
DES222	Fundamental Digital Design 디지털 디자인 기초	○	○	○	3-3-0		2
DES231	Design Knowledge and Skills 디자인 지식과 기술	○	○	○	3-3-0		2
DES233	Design for Sustainability 지속가능한 디자인	○	○	○	3-3-0		2
DES315	Design Methodology 디자인 방법론	○	○	○	3-3-0		1
DES324	Prototyping for Design 디자인 프로토타이핑	○	○	○	3-3-0		1
DES341	Fundamental Electrical-Electronic Practice 기초전기전자실습	○	○	○	3-2-2		2
DES342	Service design fundamental 서비스 디자인 기초	○	○	○	3-2-2		1
DES402	Interactive Technology 인터랙티브 기술	○	○	○	3-3-0		1
DES406	Usability Engineering 사용성 공학	○	○	○	3-3-0		2
DES410	Special Topics in Design I 디자인 특론 I	○	○	○	3-3-0		-
DES420	Special Topics in Design II 디자인 특론 II	○	○	○	3-3-0		-
DES430	Special Topics in Design III 디자인 특론 III	○	○	○	3-3-0		-
BME222	Introduction to Human Factor Engineering 인간공학개론	○	○	○	3-3-0		1
BME206	Cognitive Neuroscience 인지신경과학	○	○	○	3-3-0		1
BME303	Color Science & Engineering 색채과학과 공학	○	○	○	3-3-0		1
BME307	Biomechanics 생체역학	○	○	○	3-3-0		2
BME308	Sensation and Perception 감각과 지각	○	○	○	3-3-0		2

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
BME310	Experimental Design 실험계획법	○	○	○	3-3-0	[PRE] MTH211	1
BME436	Affective Engineering 감성공학	○	○	○	3-3-0		2
MEN201	Computational Tools for Engineers 공학전산기법	○	○	○	3-3-0		2
MEN455	3D Printing 3D 프린팅	○	○	○	3-3-0		1
MEN461	Introduction to Robotics 로봇공학	○	○	○	3-3-0		2
MGT204	Marketing Management 마케팅 관리	○	○	○	3-3-0		1, 2
MGT471	Managing Innovation and Change 혁신과 변화의 관리	○	○	○	3-3-0		1
CSE468	Information Visualization 정보시각화기술	○	○	○	3-3-0	[PRE] CSE221, CSE351	1
<b>Total</b>		<b>78</b>	<b>78</b>	<b>78</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
ID	IID201 Design Elements and Principles 디자인요소와 원리	→	DES201 Design Elements and Principles 디자인요소와 원리
	IID202 Product Design Fundamentals 제품디자인기초		DES202 Product Design Fundamentals 제품디자인기초
	IID206 Design Visualization 디자인 시각화		DES206 Design Visualization 디자인 시각화
	IID232 3D CAD 3D CAD		DES232 3D CAD 3D CAD
	IID301 Product Design I 제품디자인 I		DES301 Product Design I 제품디자인 I
	IID302 Product Design II 제품디자인 II		DES302 Product Design II 제품디자인 II
	IID332 UX design research methods UX 디자인 연구 방법		DES332 UX design research methods UX 디자인 연구 방법
	IID405 Design Communication 디자인 커뮤니케이션		DES405 Design Communication 디자인 커뮤니케이션

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Track	2020	→	2021
ID	IID431 Creative Design 1 창의디자인 1	→	DES431 Creative Design 1 창의디자인 1
	IID432 Creative Design 2 창의디자인 2		DES432 Creative Design 2 창의디자인 2
	IID221 Design History & Contexts 디자인 역사와 맥락		DES221 Design History & Contexts 디자인 역사와 맥락
	IID231 Design Knowledge and Skills 디자인 지식과 기술		DES231 Design Knowledge and Skills 디자인 지식과 기술
	IID233 Design for Sustainability 지속가능한 디자인		DES233 Design for Sustainability 지속가능한 디자인
	IID304 Interactive Technology 인터랙티브 기술		DES402 Interactive Technology 인터랙티브 기술
	IID315 Design Methodology 디자인 방법론		DES315 Design Methodology 디자인 방법론
	IID324 Prototyping for Design 디자인 프로토타이핑		DES324 Prototyping for Design 디자인 프로토타이핑
	IID341 Fundamental Electrical-Electronic Practice 기초전기전자실습		DES341 Fundamental Electrical-Electronic Practice 기초전기전자실습
	IID404 Service design fundamental 서비스 디자인 기초		DES342 Service design fundamental 서비스 디자인 기초
	IID410 Special Topics in IID I 통합산업디자인특론 I		DES410 Special Topics in Design I 디자인 특론 I
	IID420 Special Topics in IID II 통합산업디자인특론 II		DES420 Special Topics in Design II 디자인 특론 II
	IID430 Special Topics in IID III 통합산업디자인특론 III		DES430 Special Topics in Design III 디자인 특론 III
	IID442 Embedded System Principle and Practice 임베디드 시스템 이론 및 실습		Closed

※ The course code for all ID courses has been changed from IID〇〇〇 to DES〇〇〇 except closed course(IID442), and ID track students including old track can take Design undergraduate courses to their own credits.

## 5. Curriculum Map [교육과정 이수 체계도]

Sophomore		Junior		Senior	
Spring	Fall	Spring	Fall	Spring	Fall
Design Elements and Principles	Product Design Fundamentals	Product Design1	Product Design2	Creative Design1	Creative Design2
Design Visualization	3D CAD	Prototyping for Design	UX design research methods	Design Communication	Usability Engineering
	Design Knowledge and Skills	Design Methodology	Fundamental Electrical -Electronic Practice	Interactive Technology	
	Design for Sustainability	Service design fundamental			
	Fundamental Digital Design				

# Department of Biomedical Engineering

## [바이오메디컬공학과]

### ■ Department Introduction [학과소개]



Department of biomedical engineering (BME) aims to improve human health by applying advanced engineering principles and methods to medical and biological problems, such as disease diagnostics, health monitoring, treatment, and therapy. In order to meet the increased needs in healthcare, BME at UNIST pursues to train creative global leaders through top-class interdisciplinary research and education programs. Our competitive research programs are focused on selected topics including advanced biomedical devices, rehabilitation and regenerative engineering, genome engineering, brain & cognitive engineering, and digital healthcare.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 33 Credits
	Elective 선택[학과 지정]	16 Recommend: Calculus2(3), General Physics2(3), General Chemistry2(3), Statistics(3), AIP2(3), BME to change the world(1)	
Major 전공	Required 필수	21 Refer to Required course list below	At least 54 Credits
	Elective 선택	33 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	10	All courses accepted	At least 10 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			16 credits	-	-
1	MTH112	Calculus II (3)	●		
2	PHY103	General Physics II (3)	●		
3	CHM102	General Chemistry II (3)	●		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	○		
7	MTH203	Applied Linear Algebra (3)	○		
8	MTH211	Statistics (3)	●		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	●		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI107	Understanding Major (1) <b>BME to change the world</b>	●		

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [바이오메디컬공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Biomedical Engineering	21	33	54	15	24	39	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BME210	Engineering Mathematics 공학수학	○	○		3-3-0		1
BME211	Engineering Physiology 공학생리학	○	○	○	3-3-0		2
BIO301	Cell Biology 세포생물학	○			3-3-0		1
BME301	Computational Methods for Biomedical Engineering 생명공학전산	○	○	○	3-3-0		1
BME306	Biostatistics for Engineers 공학통계	○			3-3-0		2
BME313	Biomedical Instrumentation Laboratory 의료기기실험	○	○	○	3-1-4		2
BME490	Capstone Project 캡스톤 프로젝트	○	○	○	3-2-2		1,2
<b>Total</b>		<b>21</b>	<b>15</b>	<b>12</b>			

※Courses that are not required for Minor/Double Major can be counted as Elective course.

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## ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BME201	Introduction to Network Biology 네트워크생물학개론	○	○	○	3-3-0		2
BME202	Genomics 계놈학	○	○	○	3-3-0		2
BME203	Introduction to Bioinformatics 생물정보학개론	○	○	○	3-3-0		2
BME204	Biosensors & Signals 바이오센서와 신호	○	○	○	3-1-4		1
BME206	Cognitive Neuroscience 인지신경과학	○	○	○	3-3-0		2
BME212	Biomedical instrumentation & analysis 의생명기기분석	○	○	○	3-3-0		1
BME213	Biophysical Chemistry 생물물리화학	○	○	○	3-3-0	[PRE] CHM101, CHM102	1
BME219	Optical Imaging 광학이미징	○	○	○	3-3-0		2
BME222	Introduction to Human Factor Engineering 인간공학개론	○	○	○	3-3-0		1
BME235	Tissue Engineering 조직공학	○	○	○	3-3-0	[IDEN] MSE360	2
BME302	Stem Cell Engineering 줄기세포공학	○	○	○	3-3-0		2
BME303	Color Science & Engineering 색체과학과 공학	○	○	○	3-3-0		1
BME304	Brain and Human Behavior I – Common to humans 뇌와 인간행동 I – 공통특성	○	○	○	3-3-0		1
BME305	Brain and Human Behavior II – Difference between humans 뇌와 인간행동 II – 개인차	○	○	○	3-3-0		2
BME307	Biomechanics 생체역학	○	○	○	3-3-0		1
BME308	Sensation and Perception 감각과 지각	○	○	○	3-3-0		2
BME309	Decision Making and the Brain 의사결정의 신경과학	○	○	○	3-3-0		1
BME310	Experimental Design 실험계획법	○	○	○	3-3-0	[PRE] MTH211	1
BME311	Transport Phenomena in Biological Systems 생체유체역학	○	○	○	3-3-0	[PRE] MTH201	1
BME320	Advanced Biomedical Instruments 최신의료기기	○	○	○	3-3-0		2
BME321	Biomedical Optics 의광학개론	○	○	○	3-3-0		2
BME325	Nano-Biomaterial Science and Engineering 나노생체재료	○	○	○	3-3-0		2
BME326	Genome Technology 계놈응용기술학	○	○	○	3-3-0		1
BME330	Introduction to Phenomics 피노믹스: 표현형의 분석과 이해	○	○	○	3-3-0		2
BME331	Introduction to Neuroimaging 뉴로이미징 개론	○	○	○	3-3-0		2
BME333	Genetics 유전학	○	○	○	3-3-0		2

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BME401	Special Topics in Biomedical Engineering I 바이오메디컬공학특론 I	○	○	○	3-3-0		-
BME402	Special Topics in Biomedical Engineering II 바이오메디컬공학특론 II	○	○	○	3-3-0		-
BME403	Special Topics in Biomedical Engineering III 바이오메디컬공학특론 III	○	○	○	3-3-0		-
BME404	Advanced Topics in Genomics 고급게놈학	○	○	○	3-3-0		2
BME405	Animal Cell Culture 동물세포공학	○	○	○	3-3-0		2
BME407	Computational Imaging 전산 이미징	○	○	○	3-3-0		1
BME408	Biomedical Chemistry 의생명학	○	○	○	3-3-0		2
BME410	Advanced Proteomics 고급 단백질체학	○	○	○	3-3-0		1
BME411	Biological Physics 생물물리학	○	○	○	3-3-0		2
BME412	Organ-on-a-chip 생체모사공학	○	○	○	3-3-0		1
BME413	Advanced Bioinstrumentation Lab. 고급 생체계측 실습	○	○	○	3-2-1		2
BME421	Nano-Bio Engineering 나노바이오공학	○	○	○	3-3-0		1
BME424	Cancer Genomics 암 게놈학	○	○	○	3-3-0	[PRE] BME202 BME203	1
BME433	Laser and Biomedical Application 레이저와 바이오 응용	○	○	○	3-3-0		1
BME434	Computational Neuroscience 계산신경과학	○	○	○	3-3-0		1
BME436	Affective Engineering 감성공학	○	○	○	3-3-0		2
MEN230	Solid Mechanics I 고체역학 I	○	○	○	3-3-0		1
MEN451	Introduction to MEMS MEMS 개론	○	○	○	3-3-0		1
MEN455	3D Printing 3D 프린팅	○	○	○	3-3-0		1
MTH342	Probability 확률론	○	○	○	3-3-0		2
DES332	UX design research methods UX 디자인 연구 방법	○	○	○	3-3-0		2
DES342	Service design fundamental 서비스 디자인 기초	○	○	○	3-2-2		1
BIO201	Molecular Biology 분자생물학	○	○	○	3-3-0		2
BIO211	Biochemistry I 생화학 I	○	○	○	3-3-0		1
BIO301	Cell Biology 세포생물학	○	○	○	3-3-0		1
BIO305	Neuroscience I 신경과학 I	○	○	○	3-3-0		1
BIO306	Neuroscience II 신경과학 II	○	○	○	3-3-0		2

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Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BIO320	Genome Integrity and Cancer 유전체 총체성과 암 발생의 이해	○	○	○	3-3-0	[PRE] BIO201	1
BIO331	Microbiology 미생물학	○	○	○	3-3-0		1
BIO333	Genetics 유전학	○	○	○	3-3-0	[PRE] BIO201 or BIO211	2
BIO432	Immunology 면역학	○	○	○	3-3-0		1
BIO435	Cancer Biology 암생물학	○	○	○	3-3-0	[PRE] BIO201, BIO301	1
ECHE242	Machine Learning for Chemical Engineering 화학공학 머신러닝	○	○	○	3-3-0		1
ECHE312	Electrochemistry 전기화학	○	○	○	3-3-0		1
ECHE322	Instrumental Analysis 기기분석	○	○	○	3-3-0	[IDEN] CHM391	2
ECHE340	Biochemical Engineering 생물화학공학	○	○	○	3-3-0		1
ECHE441	Introduction to Molecular Biotechnology 분자생물공학	○	○	○	3-3-0		2
CSE362	Artificial Intelligence 인공지능	○	○	○	3-3-0		1
CSE463	Machine Learning 기계 학습	○	○	○	3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	1
CHM371	Introduction to Nanochemistry 나노화학개론	○	○	○	3-3-0		2
CHM421	Introduction to Chemical Biology 화학생물학개론	○	○	○	3-3-0		
IE207	Statistical Computing 통계계산	○	○	○	3-3-0		2
IE303	Data Mining 데이터 마이닝	○	○	○	3-3-0		1
IE406	Applied Machine Learning 기계학습 응용	○	○	○	3-3-0	[PRE] IE303, MTH211	1
IE313	Time-series Analysis 시계열 분석	○	○	○	3-3-0	[PRE] MTH211	2
IE408	Principles of Deep Learning 딥러닝 원론	○	○	○	3-3-0	[PRE] ITP117	1
Title		219	219	219			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
BME	BME211(Required) Introduction to Biomedical Engineering 생명공학개론	→	BME211(Required) Engineering Physiology 공학생리학

Track	2020	→	2021
BME	BME212(Elective) Bio-instrumental Analysis 바이오기기분석	→	BME212(Elective) Biomedical instrumentation & analysis 의생명기기분석
	BME319(Elective) Optical Imaging 광학이미징		BME219(Elective) Optical Imaging 광학이미징
	BME435(Required) Tissue Engineering 조직공학		BME235(Elective) Tissue Engineering 조직공학
	BME321(Elective) Introduction to Biomedical Optics 의광학개론		BME321(Elective) Biomedical Optics 의광학개론
	BME322(Elective) Physiology for Engineers 공학도를 위한 인체생리학		BME211(Required) Engineering Physiology 공학생리학
	BME331(Elective) Biomedical Imaging 의생명이미징		BME331(Elective) Introduction to Neuroimaging 뉴로이미징 개론
	BME406(Elective) Drug Delivery Systems 약물전달시스템		⟨Closed⟩ [Substitution/대체] BME412(Elective) Organ-on-a-chip 생체모사공학
	BME407(Elective) Bio-image Precessing 바이오 영상 처리		BME407(Elective) Computational Imaging 전산 이미징
	BME470(Required) BME Senior Design I BME 시니어 디자인 I		⟨Closed⟩ [Substitution/대체] BME204(Elective) Biosensors & Signals 바이오센서와 신호
	BME480(Required) BME Senior Design II BME 시니어 디자인 II		⟨Closed⟩ [Substitution/대체] BME490(Required) Capstone Project 캡스톤 프로젝트
	HFE401(Required) Capstone Project 캡스톤 프로젝트		BME490(Required) Capstone Project 캡스톤 프로젝트
HFE	HFE202(Required) Human Factors Fundamentals 인간공학개론	→	BME222(Elective) Introduction to Human Factor Engineering 인간공학개론
	HFE205(Required) Physical Ergonomics 인체인간공학		BME307(Elective) Biomechanics 생체역학
	HFE206(Required) Cognitive Neuroscience 인지인간공학		BME206(Elective) Cognitive Neuroscience 인지신경과학
	HFE301(Required) Experimental Design 실험계획법		BME310(Required) Experimental Design 실험계획법
	HFE306(Required) Usability Engineering 사용성공학		DES304(Elective) Interactive Technology 인터액티브 기술
	HFE401(Required) Capstone Project 캡스톤 프로젝트		BME490(Required) Capstone Project 캡스톤 프로젝트
	HFE402(Required) Advanced Multivariate Methods and Data Mining 고급 다변량 분석과 데이터마이닝		BME306(Required) Biostatistics for Engineers 공학통계
	HFE303(Elective) Color Science & Engineering 색채과학과 공학		BME303(Elective) Color Science & Engineering 색채과학과 공학

Department of Biomedical Engineering

Track	2020	→	2021
HFE	HFE304(Elective) High Touch Design 하이터치 디자인	→	⟨Closed⟩
	HFE305(Elective) Physical Computing 피지컬 컴퓨팅		⟨Closed⟩
	HFE308(Elective) Sensation and Perception 감각과 지각		BME308(Elective) Sensation and Perception 감각과 지각
	HFE309(Elective) Work Measurement Methods 작업측정 및 방법		⟨Closed⟩
	HFE310(Elective) Brain and Human Behavior I – Common to humans 뇌와 인간행동 I – 공통특성		BME304(Elective) Brain and Human Behavior I – Common to humans 뇌와 인간행동 I – 공통특성
	HFE311(Elective) Brain and Human Behavior II – Difference between humans 뇌와 인간행동 II – 개인차		BME305(Elective) Brain and Human Behavior II – Difference between humans 뇌와 인간행동 II – 개인차
	HFE404(Elective) Brain-Computer Interface Design 뇌-컴퓨터 인터페이스 디자인		BME434(Elective) Computational Neuroscience 계산신경과학
	HFE405(Elective) Safety Engineering 안전공학		⟨Closed⟩
	HFE406(Elective) Affective Engineering 감성공학		BME436(Elective) Affective Engineering 감성공학
	HFE407(Elective) Research Practicum in Human Factors 인간공학 연구 실무		⟨Closed⟩
	HFE408(Elective) Decision Making and the Brain 의사결정의 신경과학		BME309(Elective) Decision Making and the Brain 의사결정의 신경과학
	HFE410(Elective) Special Topics in HFE I 인간공학특론 I		⟨Closed⟩
	HFE420(Elective) Special Topics in HFE II 인간공학특론 II		⟨Closed⟩

※ Students affiliated in previous BME/HFE track can take newly opened course in department of biomedical engineering and the course can be counted as refer to each year curriculum. (But required course must be followed as each student's curriculum) 기존 BME/HFE 트랙 학생들은 바이오메디컬공학과에서 신규 추가된 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음. (단, 필수교과는 본인 교육과정년도에 따라 이수하여야 함)

## 5. Curriculum Map [교육과정 이수 체계도]

2 <sup>nd</sup> year-Spring	2 <sup>nd</sup> year-Fall	3 <sup>rd</sup> year-Spring	3 <sup>rd</sup> year-Fall	4 <sup>th</sup> year-Spring	4 <sup>th</sup> year-Fall
<b>Required courses</b>					
BME210 Engineering Mathmatics	BME211 Engineering Physiology	BIO301 Cell Biology	BME306 Biostatistics for Engineers	BME490 Capstone Project	BME490 Capstone Project
		BME301 Computational Methods for Biomedical Engineering	BME313 Biomedical Instrumentation Laboratory		
<b>Elective courses: PRECISION NANOMEDICINE</b>					
BME213 Biophysical Chemistry		BME311 Transport Phenomena in Biological Systems	BME325 Nano-Biomaterial Science and Engineering	BME421 Nano-Bio Engineering	BME408 Biomedical Chemistry
BME212 Biomedical Instrumentation & Analysis					
<b>Elective courses: GENOMICS and BIOINFORMATICS</b>					
	BME201 Introduction to Network Biology	BME326 Genome Technology		BME424 Cancer Genomics	BME404 Advanced Topics in Genomics
	BME202 Genomics			BME410 Advanced Proteomics	
	BME203 Introduction to Bioinformatics				
<b>Elective courses: REHABILITATION &amp; REGENERATIVE ENGINEERING</b>					
BME222 Introduction to Human Factor Engineering	BME235 Tissue Engineering	BME307 Biomechanics	BME302 Stem Cell Engineering	BME412 Organ-on-a-chip	BME413 Advanced Bioinstrumentation Lab.
					BME405 Animal Cell Culture
<b>Elective courses: BIOMEDICAL IMAGING</b>					
BME204 Biosensors & Signals	BME219 Optical Imaging		BME320 Advanced Biomedical Instruments	BME433 Laser and Biomedical Application	BME411 Biological Physics
			BME330 Introduction to Phenomics	BME407 Computational Imaging	
			BME331 Introduction to Neuroimaging		
			BME321 Biomedical Optics		

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<b>Elective courses: BRAIN &amp; COGNITIVE ENGINEERING</b>					
	BME206 Cognitive Neuroscience	BME303 Color Science & Engineering	BME305 Brain and Human Behavior II – Difference between humans	BME434 Computational Neuroscience	BME436 Affective Engineering
		BME309 Decision Making and the Brain	BME308 Sensation and Perception		
		BME310 Experimental Design	BME333 Genetics		
		BME304 Brain and Human Behavior I – Common to humans			

# Department of Industrial Engineering

## [산업공학과]

### ■ Department Introduction [학과소개]



The department of Industrial Engineering (IE) pursues state-of-the-art research and education in order to nurture data scientists who can contribute to the development of problem-solving methodologies and advancement of their applications. Under the vision of “Data-Driven Convergence,” the department of Industrial Engineering (IE) focuses on research into quantitative data analysis techniques such as statistics, optimization, data mining, artificial intelligence, process mining, and financial engineering.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 32 Credits
	Elective 선택[학과 지정]	15 Complete 15 credits including required courses Required: Applied Linear Algebra(3), Statistics(3), AIP2(3)	
Major 전공	Required 필수	24 Refer to Required course list below – Must include Project Lab (3 credits)	At least 48 Credits
	Elective 선택	24 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	17	All courses accepted	At least 17 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

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## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			15 credits	15 credits	15 credits
1	MTH112	Calculus II (3)	○	○	○
2	PHY103	General Physics II (3)			
3	CHM102	General Chemistry II (3)			
4	PHY108	General Physics Lab II (1)			
5	CHM106	General Chemistry Lab II (1)			
6	MTH201	Differential Equations (3)			
7	MTH203	Applied Linear Algebra (3)	●	●	○
8	MTH211	Statistics (3)	●	○	○
9	MGT102	Entrepreneurship (3)			
10	IE101	Introduction to Data Science(3)	○	○	○
11	ITP117	Introduction to AI Programming II (3)	●	●	○
12	ITP111	Probability & Random Process (3)			
13	ITP112	Discrete Mathematics (3)	○	○	○
14	UNI108	Understanding Major (1) <b>Industrial Engineering Relay Seminar</b>	○	○	○

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [산업공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Industrial Engineering	24	24	48	15	21	36	9	9	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
IE201	Operations Research I 계량경영학 I	○	○	○	3-3-0		2
IE207	Statistical Computing 통계계산	○	○	○	3-3-0		2
IE209	Industrial Operations Management 생산운영관리	○	○	○	3-3-0		1
IE303	Data Mining 데이터 마이닝	○	○	○	3-3-0		1
IE305	Operations Research II 계량경영학 II	○	○	○	3-3-0	[PRE] IE201, IE209	1
IE313	Time-series Analysis 시계열 분석	○	○	○	3-3-0	[PRE] MTH211	2
IE404	Data-driven Process Management 데이터 기반 프로세스 관리	○	○	○	3-3-0		2
IE406	Applied Machine Learning 기계학습 응용	○	○	○	3-3-0	[PRE] IE303, MTH211	1

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
IE450	Project Lab. 프로젝트 랩	○	○		3-1-4		1
	Total	27	27	24			

※ Students with major/double major must complete 'Project Lab(3)' as a required course.

※ 'Project Lab' course not required for Minor can be counted as Free Elective course.

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
IE314	Investment Science 계량투자론	○	○	○	3-3-0		-
IE308	Service Intelligence 서비스 지능	○	○	○	3-3-0	[PRE] IE209	2
IE361	Quantitative Technology Management 계량기술경영	○	○	○	3-3-0		2
IE362	Statistical Quality Management 통계적 품질관리	○	○	○	3-3-0		1
IE408	Principles of Deep Learning 딥러닝 원론	○	○	○	3-3-0	[PRE] ITP117, IE303	1
IE412	Advanced Investment Science 고급계량투자론	○	○	○	3-3-0	[PRE] IE314	1
IE421	Blockchain Systems 블록체인 시스템	○	○	○	3-3-0		1
IE422	Social Network Analysis 사회 연결망 분석	○	○	○	3-3-0	[PRE] IE303	2
IE470	Special Topics in IE I IE 특론 I	○	○	○	3-3-0		-
IE471	Special Topics in IE II IE 특론 II	○	○	○	3-3-0		-
IE472	Special Topics in IE III IE 특론 III	○	○	○	3-3-0		-
MEN201	Computational Tools for Engineers 공학전산기법	○	○	○	3-3-0		2
MEN301	Numerical Analysis 수치해석	○	○	○	3-2-2	[PRE] MTH201	2
MEN353	Manufacturing System Design & Simulation 생산시스템 설계 및 시뮬레이션	○	○	○	3-3-0		2
MEN455	3D Printing 3D 프린팅	○	○	○	3-3-0		1
UEE206	Science Humanities 과학인문학	○	○	○	3-3-0		1
CSE362	Artificial Intelligence 인공지능	○	○	○	3-3-0	[PRE] CSE331, MTH203, MTH112, ITP111	1
CSE364	Software Engineering 소프트웨어공학	○	○	○	3-3-0		1
CSE463	Machine Learning 기계 학습	○	○	○	3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	
BME310	Experimental Design 실험계획법	○	○	○	3-3-0	[PRE] MTH211	

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BME206	Cognitive Neuroscience 인지신경과학	○	○	○	3-3-0		
BME222	Introduction to Human Factor Engineering 인간공학개론	○	○	○	3-3-0		
MTH251	Mathematical Analysis I 해석학 I	○	○	○	3-3-0		
MTH321	Numerical Analysis 수치해석학	○	○	○	3-3-0	[PRE] MTH201, MTH203	
MTH333	Scientific Computing 과학계산	○	○	○	3-3-0		
MTH342	Probability 확률론	○	○	○	3-3-0		
MTH361	Mathematical Modeling and Applications 수리모형방법론	○	○	○	3-3-0	[PRE] MTH201, MTH203	
MTH344	Mathematical Statistics 수리통계학	○	○	○	3-3-0		
MTH421	Introduction to Partial Differential Equations 편미분방정식개론	○	○	○	3-3-0	[PRE] MTH201, MTH203	
MTH461	Stochastic Processes 확률과정론	○	○	○	3-3-0	[PRE] MTH342	
MGT315	Econometrics 계량경제학	○	○	○	3-3-0	[PRE] MTH211	
Title		93	93	93			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

\*Students affiliated in previous MGE track can take newly opened course in department of IE and the course can be counted as required or elective (refer to each year curriculum). 기존 경영공학부 트랙 학생들은 산업공학과에서 신규 추가된 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
MGE	MGE201(Required) Operations Research I 계량경영학 I	→	IE201(Required) Operations Research I 계량경영학 I
	MGE205(Required) Investment Science 계량투자론		IE314(Elective) Investment Science 계량투자론
	MGE206(Required) Introduction to Industrial & Management Engineering 산업경영공학의 이해		only designated substitute course upon request of retaking courses from students who already took the courses before
	MGE207(Required) Data Science Programming 데이터 사이언스 프로그래밍		IE207(Required) Statistical Computing 통계계산
	MGE209(Required) Operations Management 생산운영관리		IE209(Required) Industrial Operations Management 생산운영관리
	MGE303(Required) Data Mining 데이터 마이닝		IE303(Required) Data Mining 데이터 마이닝
	MGE305(Required) Operations Research II 계량경영학 II		IE305(Required) Operations Research II 계량경영학 II

Track	2020	→	2021
MGE	MGE313(Required) Time-series Analysis 시계열 분석	→	IE313(Required) Time-series Analysis 시계열 분석
	MGE404(Required) Data-driven Process Management 데이터 기반 프로세스 관리		IE404(Required) Data-driven Process Management 데이터 기반 프로세스 관리
	MGE406(Required) Applied Machine Learning 기계학습 응용		IE406(Required) Applied Machine Learning 기계학습 응용
	MGE450(Required) Project Lab. 프로젝트 랩		IE450(Required) Project Lab. 프로젝트 랩
	MGE308(Elective) Service Simulation 서비스 시뮬레이션		IE308(Elective) Service Intelligence 서비스 지능
	MGE361(Elective) Quantitative Technology Management 계량기술경영		IE361(Elective) Quantitative Technology Management 계량기술경영
	MGE362(Elective) Statistical Quality Management 통계적 품질관리		IE362(Elective) Statistical Quality Management 통계적 품질관리
	MGE412(Elective) Advanced Investment Science 고급계량투자론		IE412(Elective) Advanced Investment Science 고급계량투자론
	MGE421(Elective) Blockchain Systems 블록체인 시스템		IE421(Elective) Blockchain Systems 블록체인 시스템
	MGE422(Elective) Social Network Analysis 사회 연결망 분석		IE422(Elective) Social Network Analysis 사회 연결망 분석
	MGE470(Elective) Special Topics in MGE I MGE 특론 I		IE470(Elective) Special Topics in IE I IE 특론 I
	MGE471(Elective) Special Topics in MGE II MGE 특론 II		IE471(Elective) Special Topics in IE II IE 특론 II
	MGE472(Elective) Special Topics in MGE III MGE 특론 III		IE472(Elective) Special Topics in IE III IE 특론 III

Department of Industrial Engineering

## 5. Curriculum Map [교육과정 이수 체계도]

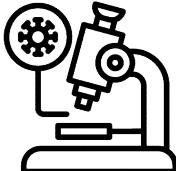
Sophomore 1 <sup>st</sup> semester	Sophomore 2 <sup>nd</sup> Semester	Junior 1 <sup>st</sup> semester	Junior 2 <sup>nd</sup> Semester	Senior 1 <sup>st</sup> semester	Senior 2 <sup>nd</sup> Semester
Industrial Operations Management (IE 209)	Operations Research I (IE201)	Operations Research II (IE305)	Time-series Analysis (IE 313)	Applied Machine Learning (IE 406)	Data-driven Process Management (IE 404)
	Statistical Computing (IE 207)	Data Mining (IE303)		Project Lab (IE 450)	
		Statistical Quality Management (IE 362)	Service Intelligence (IE 308)	Principles of Deep Learning (IE408)	Social Network Analysis (IE 422)
		Investment Science (IE314)	Quantitative Technology Management (IE 361)	Advanced Investment Science (IE 412)	
				Blockchain Systems (IE 421)	

\*Yellow: Required, Pink: Elective

# Department of Biological Sciences

## [생명과학과]

### ■ Department Introduction [학과소개]



Biological Sciences have taken the center stage of science, technology, and industry. Biomedical healthcare industry is the biggest industry; it is more than three times the information-communication industry and the automobile industry combined. All areas of basic science and engineering are focused on Biology. For example, bioinformatics, biomechanics, and biochemical engineering are “hot” areas. Infectious diseases such as the pandemic coronavirus are accelerating this trend even further. The 21 faculty members at the Department of Biological Sciences at UNIST study diseases like cancer, diabetes, and neurodegenerative disease as well as basic biology such as neuroscience, development, and microbes including viruses. They are internationally recognized for their high impact papers published and prestigious research funds obtained. UNIST Biological Sciences will open doors to a bright future.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 32 Credits
	Elective 선택[학과 지정]	15 Required: Applied Linear Algebra(3), Statistics(3)	
Major 전공	Required 필수	32 Refer to Required course list below - Must include Thesis research(3 credits)	At least 54 Credits
	Elective 선택	22 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	11	All Courses Accepted	At least 11 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

Department of Biological Sciences

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			15 credits	6 credits	-
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)			
7	MTH203	Applied Linear Algebra (3)	●	●	
8	MTH211	Statistics (3)	●	●	
9	MGT102	Entrepreneurship (3)			
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)			
13	ITP112	Discrete Mathematics (3)			
14	UNI109	Understanding Major (1) Current Topics in Biological Sciences	○		

●: Required ○: Elective ●: Recommended, ( ): credits

## 3. Curriculum [생명과학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Biological Sciences	32	22	54	14	22	36	11	7	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Seme ster
BIO201	Molecular Biology 분자생물학	○	○	○	3-3-0		2
BIO211	Biochemistry I 생화학 I	○	○	○	3-3-0		1
BIO261	Biochemistry Laboratory 생화학실험	○	○	○	2-4-0		1,2
BIO301	Cell Biology 세포생물학	○	○	○	3-3-0		1
BIO305	Neuroscience I 신경과학 I	○			3-3-0		1
BIO330	Bioinformatics 생물정보학	○			3-3-0		2
BIO331	Microbiology 미생물학	○			3-3-0		1
BIO333	Genetics 유전학	○			3-3-0	[PRE] BIO201 or BIO211	2

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BIO430	Developmental Biology 발생학	○			3-3-0	[PRE] BIO201	1
BIO432	Immunology 면역학	○			3-3-0		1
BIO490	Thesis Research 졸업논문	○	○		3-3-0		1,2
	<b>Total</b>	<b>32</b>	<b>14</b>	<b>11</b>			

※Courses that are not required for Minor/Double Major can be counted as Elective course.

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BIO202	Molecular Biology Laboratory 분자생물학 실험	○	○	○	2-0-4		2
BIO221	Biochemistry II 생화학 II	○	○	○	3-3-0		2
BIO231	The Chemical Basis of Life 생명현상의 화학적 이해	○	○	○	3-3-0		2
BIO306	Neuroscience II 신경과학 II	○	○	○	3-3-0		2
BIO307	Current Topics in Biological Sciences 현대생명과학동향	○	○	○	2-2-0		1
BIO314	Instrumental Bioanalysis 생물기기분석	○	○	○	3-3-0		1
BIO316	Protein Science 단백질학	○	○	○	3-3-0		2
BIO320	Genome Integrity and Cancer 유전체 총체성과 암 발생의 이해	○	○	○	3-3-0	[PRE] BIO201	1
BIO332	Anatomy and Physiology 해부 및 생리학	○	○	○	3-3-0		2
BIO361	Cell Biology & Genetics Laboratory 세포생물학 및 유전학실험	○	○	○	2-4-0		1
BIO401	Special Topics in Biological Sciences I 생명과학특론 I	○	○	○	3-3-0		-
BIO402	Special Topics in Biological Sciences II 생명과학특론 II	○	○	○	3-3-0		-
BIO403	Special Topics in Biological Sciences III 생명과학특론 III	○	○	○	3-3-0		-
BIO404	Introduction to Biological Physics 기초생물물리학	○	○	○	3-3-0		1
BIO412	Microbial Physiology 미생물생리학	○	○	○	3-3-0	[PRE] BIO331	2
BIO433	Biochemistry of Signal Transduction and Regulation 세포신호전달	○	○	○	3-3-0		1
BIO435	Cancer Biology 암생물학	○	○	○	3-3-0	[PRE] BIO201, BIO301	1
BIO436	Emerging Principles of Gene Expression 유전자 발현의 이해	○	○	○	3-3-0		1
BIO438	Endocrinology and Metabolism 내분비 및 대사학	○	○	○	3-3-0		2
BIO440	Developmental Biology II 발생학 II	○	○	○	3-3-0	[PRE] BIO430	2

Department of Biological Sciences

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
BME202	Genomics 계놈학	○	○	○	3-3-0		2
BME203	Introduction to Bioinformatics 생물정보학개론	○	○	○	3-3-0		1
BME313	Biomedical Instrumentation Laboratory 의료기기실험	○	○	○	3-1-4		2
BME321	Biomedical Optics 의광학개론	○	○	○	3-3-0		1
BME326	Genome Technology 계놈응용기술학	○	○	○	3-3-0		1
BME424	Cancer Genomics 암 계놈학	○	○	○	3-3-0		1
<b>Total</b>		<b>78</b>	<b>78</b>	<b>78</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
BIO	BIO303 Neurobiology	→	⟨Closed⟩
	BIO305 Principles of Neuroscience I (Change the course title)		BIO305 Neuroscience I
	BIO306 Principles of Neuroscience II (Change the course title)		BIO306 Neuroscience II
	BIO304 Current Topics in Biological Sciences (3-3-0)		BIO307 Current Topics in Biological Sciences (2-2-0)
	BIO431 Bioinformatics (Change the course code & title)		BIO330 Bioinformatics
	BIO331 Microbiology (Elective)		BIO331 Microbiology (Required)
	BIO332 Anatomy and Physiology (Required)		BIO332 Anatomy and Physiology (Elective)
	BIO333 Genetics (Elective)		BIO333 Genetics (Required)
	BIO302 Developmental Biology (Chang the course code, Elective)		BIO430 Developmental Biology (Required)
	BIO436 Gene Expression (Change the course title)		BIO436 Emerging Principles of Gene Expression (Elective)

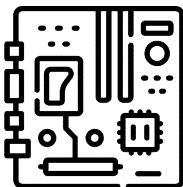
## 5. Curriculum Map [교육과정 이수 체계도]

2 <sup>nd</sup> year-Spring	2 <sup>nd</sup> year-Fall	3 <sup>rd</sup> year-Spring	3 <sup>rd</sup> year-Fall	4 <sup>th</sup> year-Spring	4 <sup>th</sup> year-Fall
Biochemistry1	Biochemistry2	Neuroscience1	Neuroscience2	Developmental Biology	Endocrinology and Metabolism
Biochemistry Lab	Molecular Biology	Cell biology	Anatomy and Physiology	Immunology	Special Topics in Biological Sciences 1~3
	Molecular Biology Lab	Cell Biology & Genetics Lab	Protein Science	Biochemistry of Signal Transduction and Regulation	Developmental Biology 2
	The Chemical Basis of Life	Current Topics in BIO	Genetics	Cancer Biology	Introduction to Biological Physics
		Microbiology	Microbial Physiology	Emerging Principles of Gene Expression	
		Genome Integrity and Cancer	Bioinformatics		
		Instrumental Bioanalysis			

# Department of Electrical Engineering

## [전기전자공학과]

### ■ Department Introduction [학과소개]



Electrical engineering (EE) is a field of engineering that deals with everything from solid-state devices and designing integrated circuits to developing information and control systems. It focuses on research and development of IT convergence systems which are capable of enriching the future life of human being to be pleasant, secured, convenient and socially connected. A broad range of IT technologies in the EE areas are to be proactively merged together to create new benefits with the advent of ubiquitous information society driven by digital convergence.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 33 Credits
	Elective 선택[학과 지정]	16 Required: Calculus II(3), Applied Linear Algebra(3), Differential Equations(3), Understanding major (1) + any elective and recommended courses (6 credits) by dept.	
Major 전공	Required 필수	21 Refer to Required course list below * At least 18 credits (Required courses) + Undergraduate research(3)	At least 48 Credits
	Elective 선택	27 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	16	All Courses Accepted	At least 16 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			16 credits	10 credits	10 credits
1	MTH112	Calculus II (3)	●	●	●
2	PHY103	General Physics II (3)	○		
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	●	●	●
7	MTH203	Applied Linear Algebra (3)	●	●	●
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI110	Understanding Major (1) Introduction to Modern Electrical Engineering	●	●	●

●: Required ○: Elective ◉: Recommended, ( ): credits

\* 부전공/복수전공은 기초 이수요건 교과목 (미적분학II, 미분방정식, 응용선형대수, 전공기초과목)을 전공 진입(변경) 전에 이수하는 것을 권장, 전공 진입(변경) 후에는 첫학기 이내에 필수 이수

\* Students in minor and Double major are recommended to take the fundamental required courses before selecting or transfer the major and at least should complete them within the first semester after the major selection or transfer.

## 3. Curriculum [전기전자공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Electrical Engineering	21	27	48	18	18	36	18	0	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
EEE201	Basic Circuit Theory and Laboratory 회로이론 및 실험	○	○	○	4-3-2		1
EEE202	Digital Logic and Laboratory 디지털로직 및 실험	○	○	○	4-3-2		2
EEE204	Electromagnetics I 전자기학 I	○	○	○	3-3-0		1
EEE205	Signals and Systems 신호및시스템	○	○	○	3-3-0		2
EEE301	Communications and Information Theory 통신 및 정보 이론	○	○	○	3-3-0	[PRE] ITP111	1
EEE302	Electric Energy Systems 전기에너지시스템	○	○	○	3-3-0	[PRE] EEE201	1
EEE303	Microelectronics I and Laboratory 전자회로 I 및 실험	○	○	○	4-3-2	[PRE] EEE201	1,2 (Only 2021)

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
EEE304	Semiconductor Engineering 반도체공학	○	○	○	3-3-0		1
EEE490	Undergraduate research 졸업연구	○	-	-	3-3-0		-
<b>Total</b>		<b>30</b>	<b>27</b>	<b>27</b>			

※ Major: At least 18 credits (Required courses) + Undergraduate research (3 credits) should be completed. (필수교과 최소 18학점과 졸업연구(3) 필수이수. 그 외 선택과목으로 인정)

※ Minor: At least 18 credits should be completed. (필수교과 최소 18학점 필수이수)

※ Double: At least 18 credits should be completed. (필수교과 최소 18학점 필수이수. 그 외 선택과목으로 인정)

※ EEE490 Undergraduate research not required for Minor/Double Major can be counted as Free Elective course.

#### ▶ Required course for students following 135/142 credits curriculum (~2020 curriculum)

Course Code	Course Title	Cred -Lect -Exp	Pre requisite	Semester	Subject to be recognized 수강신청 및 필수학점 인정대상
EE320	Digital System Lab 디지털시스템실험	3-1-4	EE201, (Currently, EEE201) & CSE201 (Currently, EEE202)	1	Only for those who follow before 2020 curriculum *EE321(closed) is replaced with this course. *It is not required to 2021 entrants. <b>2020년(포함) 이전 교육과정을 따르는 학생</b> *2014년까지 필수과목인 EE321전자회로실험(폐지)의 대체과목 *2021년 입학생부터 필수과목 아님

#### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
EEE223	Electrical Engineering Programming 전기전자공학 프로그래밍	○	○	○	3-3-0		1
EEE231	Electromagnetics II 전자기학 II	○	○	○	3-3-0	[PRE] EEE204	2
EEE241	Physical Electronics 물리전자	○	○	○	3-3-0		2
EEE331	Microwave Engineering 마이크로파공학	○	○	○	3-3-0	[PRE] EEE204	2
EEE311	Microelectronics II and Laboratory 전자회로 II 및 실험	○	○	○	4-3-2	[PRE] EEE303	2
EEE351	Automatic Control 자동제어	○	○	○	3-3-0		1
EEE321	Computer Networks 컴퓨터 네트워크	○	○	○	3-3-0	[IDEN] CSE351	-
EEE352	Digital Signal Processing 디지털신호처리	○	○	○	3-3-0		2
EEE353	Optimization Theory 최적화이론	○	○	○	3-3-0		2
EEE312	VLSI Design 초고밀도 집적회로 설계	○	○	○	3-3-0		2
EEE411	Analog Integrated Circuits 아날로그 집적회로 설계	○	○	○	3-3-0	[PRE] EEE311	1
EEE431	Power Electronics 전력전자공학	○	○	○	3-3-0	[PRE] EEE302	-
EEE442	Semiconductor VLSI Devices Engineering 반도체집적소자공학	○	○	○	3-3-0	[PRE] EEE304	2
EEE441	Optoelectronics 광전자공학	○	○	○	3-3-0	[PRE] EEE204, EEE304	1

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
EEE480	Special Topics in EE I 전자및전기공학특론 I	○	○	○	3-3-0		-
EEE481	Special Topics in EE II 전자및전기공학특론 II	○	○	○	3-3-0		-
EEE482	Special Topics in EE III 전자및전기공학특론 III	○	○	○	3-3-0		-
EEE483	Special Topics in EE IV 전자및전기공학특론 IV	○	○	○	3-3-0		-
EEE484	Special Topics in EE V 전자및전기공학특론 V	○	○	○	3-3-0		-
EEE485	Special Topics in EE VI 전자및전기공학특론 VI	○	○	○	3-3-0		-
CSE261	Computer Architecture 컴퓨터구조	○	○	○	3-3-0		-
CSE463	Machine Learning 기계학습	○	○	○	3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	-
PHY301	Quantum Physics I 양자물리학 I	○	○	○	3-3-0	[PRE] PHY101, PHY103	-
PHY315	Solid State Physics I 고체물리학 I	○	○	○	3-3-0	[PRE] PHY301	-
PHY427	Introduction to Plasma Physics 플라즈마 물리학 입문	○	○	○	3-3-0	[PRE] PHY203 [IDEN] NE350	-
<b>Total</b>		<b>73</b>	<b>73</b>	<b>73</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

\*Students affiliated in previous EE track can take newly opened course in department of EE can be counted as required or elective (refer to each year curriculum). 기존 EE 트랙 학생들은 전기전자공학과에서 신규 추가된 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
EE	EE201 Basic Circuit Theory 회로이론	→	EEE201 Basic Circuit Theory and Laboratory 회로이론 및 실험
	CSE201 Digital Logic 디지털로직		EEE202 Digital Logic and Laboratory 디지털로직 및 실험
	EE211 Probability and Random Processes 확률과 랜덤 프로세스		EE Major course → Basic Course ITP111 Probability and Random Processes 확률과 랜덤 프로세스
	EE231 Electromagnetics I 전자기학 I		EEE204 Electromagnetics I 전자기학 I
	EE311 Signals and Systems 신호및시스템		EEE205 Signals and Systems 신호및시스템
	EE312 Communications and Information Theory 통신 및 정보 이론		EEE301 Communications and Information Theory 통신 및 정보 이론

## Department of Electrical Engineering

Track	2020	→	2021
EE	EE341 Electric Energy Systems 전기에너지공학	→	EEE302 Electric Energy Systems 전기에너지시스템
	EE301 Microelectronics I 전자회로 I, EE321 Electronics Experiment Laboratory 전자회로실험 통폐합		EEE303 Microelectronics I and Laboratory 전자회로 I 및 실험
	EE331 Semiconductor Engineering I 반도체공학 I		EEE304 Semiconductor Engineering 반도체공학
	EE204 Electromagnetics II 전자기학 II		EEE231 Electromagnetics II 전자기학 II
	EE233 Physical Electronics 물리전자		EEE241 Physical Electronics 물리전자
	EE342 Microwave Engineering 마이크로파공학		EEE331 Microwave Engineering 마이크로파공학
	EE302 Microelectronics II 전자회로 II		EEE311 Microelectronics II and Laboratory 전자회로 II 및 실험
	EE313 Automatic Control 자동제어		EEE351 Automatic Control 자동제어
	EE314 Computer Networks 컴퓨터 네트워크		EEE321 Computer Networks 컴퓨터 네트워크
	EE411 Digital Signal Processing 디지털신호처리		EEE352 Digital Signal Processing 디지털신호처리
	EE414 Optimization Theory 최적화이론		EEE353 Optimization Theory 최적화이론
	EE402 Introduction to VLSI Design 초고밀도 집적회로 설계		EEE312 VLSI Design 초고밀도 집적회로 설계
	EE401 Analog Integrated Circuits 아날로그 집적회로 설계		EEE411 Analog Integrated Circuits 아날로그 집적회로 설계
	EE404 Power Electronics 전력전자공학		EEE431 Power Electronics 전력전자공학
	EE431 Semiconductor VLSI Devices Engineering 반도체집적소자공학		EEE442 Semiconductor VLSI Devices Engineering 반도체집적소자공학
	EE432 Optoelectronics 광전자공학		EEE441 Optoelectronics 광전자공학

## 5. Curriculum Map [교육과정 이수 체계도]

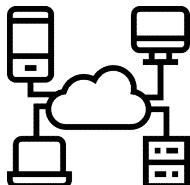
Red: Major required / Blue: Major elective

Sophomore		Junior		Senior	
Spring	Fall	Spring	Fall	Spring	Fall
회로이론및실험 Basic Circuit Theory and Laboratory	전자회로 I 및실험 Microelectronics I and Laboratory	통신및정보이론 Communications and Information Theory	초고밀도 집적회로 설계 VLSI Design	광전자공학 Optoelectronics	전력전자공학 Power Electronics
전자기학 I Electromagnetics I	신호및시스템 Signals and Systems	자동제어 Automatic Control	*컴퓨터네트워크 Computer Networks	*아날로그 집적회로 설계 Analog Integrated Circuits	반도체집적소자공학 Semiconductor VLSI Devices Engineering
전기전자공학 프로그래밍 Electrical Engineering Programming	디지털로직및실험 Digital Logic and Laboratory	전기에너지시스템 Electric Energy Systems	디지털신호처리 Digital Signal Processing		
	전자기학 II Electromagnetics II	반도체공학 Semiconductor Engineering	최적화이론 Optimization Theory		
	물리전자 Physical Electronics		*마이크로파공학 Microwave Engineering		
			전자회로 II 및실험 Microelectronics II and Laboratory		

\*: These classes are scheduled to be opened every two years.

# Department of Computer Science and Engineering [컴퓨터공학과]

## ■ Department Introduction [학과소개]



While most of people are familiar with computers, not many people have a good understanding of what computer science and engineering (CSE) is really about. Implementation of computer programs that improve the quality of human life is an important aspect of computer science and engineering, however learning how to write computer programs is not the core discipline of computer science but just a necessary skill to implement and prove creative and innovative computational logics and ideas in many broad sub-areas of computer science such as algorithms, theoretical computer science, programming languages, operating systems, databases, networks, computer security, computer graphics, artificial intelligence, and many more. In CSE track, students learn foundational principles of the core sub-areas of computer science. Having this curriculum, we cultivate the finest computer scientists and engineers that have the ability of conducting highly creative and innovative research and creating high-quality computing solutions. CSE graduates typically find jobs in IT-related companies or national research institutes or continue to study in graduate schools.

## 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 33 Credits
	Elective 선택[학과 지정]	16 Take 16 credits among the basic course list - Required: 4 courses - Recommended: 2 courses - Elective: 3 courses	
Major 전공	Required 필수	24 Refer to Required course list below	At least 48 Credits
	Elective 선택	24 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	16	All Courses Accepted	At least 16 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			16 credits	16 credits	16 credits
1	MTH112	Calculus II (3)	○	○	○
2	PHY103	General Physics II (3)			
3	CHM102	General Chemistry II (3)			
4	PHY108	General Physics Lab II (1)			
5	CHM106	General Chemistry Lab II (1)			
6	MTH201	Differential Equations (3)	○	○	○
7	MTH203	Applied Linear Algebra (3)	●	●	●
8	MTH211	Statistics (3)	●	●	●
9	MGT102	Entrepreneurship (3)			
10	IE101	Introduction to Data Science(3)	○	○	○
11	ITP117	Introduction to AI Programming II (3)	●	●	●
12	ITP111	Probability & Random Process (3)	●	●	●
13	ITP112	Discrete Mathematics (3)	●	●	●
14	UNI111	Understanding Major (1) <b>Introduction to CSE</b>	●	●	●

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [컴퓨터공학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Computer Science and Engineering	24	24	<b>48</b>	18	21	<b>39</b>	15	15	<b>30</b>

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major <sup>1)</sup>	Double <sup>2)</sup>	Minor <sup>3)</sup>	Cred. -Lect. -Exp.	Remark	Semester
CSE241	Advanced Programming 고급 프로그래밍	○	○		3-3-0		1
CSE221	Data Structures 데이터구조	○	○	○	3-3-0		2
CSE251	System Programming 시스템 프로그래밍	○	○		3-3-0		1
CSE261	Computer Architecture 컴퓨터구조	○	△		3-3-0		2
CSE271	Principles of Programming Languages 프로그래밍언어	○	○	○	3-3-0	[PRE] ITP112	2
CSE331	Introduction to Algorithms 알고리즘	○	○	○	3-3-0	[PRE] CSE221	1
CSE311	Operating Systems 운영체제	△	△		3-3-0	[PRE] CSE221	1
CSE351	Computer Networks 컴퓨터네트워크	△	△		3-3-0	[IDEN] EEE311	2

Department of Computer Science and Engineering

Course Code	Course Title	Major <sup>1)</sup>	Double <sup>2)</sup>	Minor <sup>3)</sup>	Cred. -Lect. -Exp.	Remark	Semester
CSE401	Research in Computer Science and Engineering 졸업연구	○			3-3-0		-
	Total	27	24	9			

1) Major: Take at least 1 course within recommended courses(△) except required courses(O)

2) Double major: Take at least 1 course within recommended courses(△) except required courses(O) (\*Excluding CSE401)

3) Minor: Take at least 5 courses including required courses(O) (\*Excluding CSE401)

### ▶ Elective [전공선택]

Course Code	Course Title	Major <sup>1)</sup>	Double <sup>2)</sup>	Minor <sup>3)</sup>	Cred. -Lect. -Exp.	Remark	Semester
CSE332	Theory of Computation 계산 이론	○	○	○	3-3-0	[PRE] ITP112	2
CSE333	Introduction to Human Computer Interaction 인간-컴퓨터 상호작용 개론	○	○	○	3-3-0		1
CSE362	Artificial Intelligence 인공지능	○	○	○	3-3-0	[PRE] CSE331, MTH203, MTH112	2
CSE364	Software Engineering 소프트웨어공학	○	○	○	3-3-0		1
CSE411	Introduction to Compilers 컴파일러 개론	○	○	○	3-3-0	[PRE] CSE271	2
CSE412	Parallel Computing 병렬 컴퓨팅	○	○	○	3-3-0	[PRE] CSE311	1
CSE421	Database Systems 데이터베이스 시스템	○	○	○	3-3-0	[PRE] CSE221	2
CSE463	Machine Learning 기계 학습	○	○	○	3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	1
CSE465	Mobile Computing 모바일 컴퓨팅	○	○	○	3-3-0	[PRE] CSE351	2
CSE466	Cloud Computing 클라우드 컴퓨팅	○	○	○	3-3-0	[PRE] CSE311	1
CSE467	Computer Security 컴퓨터보안	○	○	○	3-3-0	[PRE] CSE261	1
CSE468	Information Visualization 정보시각화기술	○	○	○	3-3-0	[PRE] CSE221, CSE351	2
CSE469	Intelligent Robots 지능형 로봇	○	○	○	3-3-0	[PRE] CSE331, MTH203, MTH112	1
CSE471	Computer Graphics 컴퓨터 그래픽스	○	○	○	3-3-0	[PRE] CSE221, CSE331	1
CSE472	Computer Vision 컴퓨터 비전	○	○	○	3-3-0	[PRE] MTH203, ITP111, CSE221	2
CSE480	Special Topic in CSE I 컴퓨터 공학 특론 I	○	○	○	3-3-0		-
CSE481	Special Topic in CSE II 컴퓨터 공학 특론 II	○	○	○	3-3-0		-

CSE482	Special Topic in CSE III 컴퓨터 공학 특론 III	○	○	○	3-3-0		-
CSE483	Special Topic in CSE IV 컴퓨터 공학 특론 IV	○	○	○	3-3-0		-
CSE484	Special Topic in CSE V 컴퓨터 공학 특론 V	○	○	○	3-3-0		-
MTH204	Linear Algebra 선형대수학				3-3-0	[PRE] MTH201, MTH203	2
MTH260	Elementary Number Theory 정수론				3-3-0		2
MTH344	Mathematical Statistics 수리통계학				3-3-0		-
IE303	Data Mining 데이터 마이닝				3-3-0		1
IE406	Applied Machine Learning 기계학습 응용				3-3-0	[PRE] IE303, MTH211	1
IE421	Blockchain Systems 블록체인 시스템				3-3-0		1
EEE205	Signals and Systems 신호 및 시스템				3-3-0		2
EEE351	Automatic Control 자동제어				3-3-0		1
EEE301	Communications and Information Theory 통신 및 정보 이론				3-3-0	[PRE] ITP111	1
<b>Total</b>		<b>60</b>	<b>60</b>	<b>60</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

1) Major: Up to 3 courses from other departments can be accepted as elective credits.

2) Double major: Up to 2 courses from other departments can be accepted as elective credits.

3) Minor: Only 1 course from other departments can be accepted as elective credits.

※ If a course from other departments is opened by CSE afterward, you may take only one of the CSE course and other department's course, and the additional course will not be counted as a CSE major elective course.

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
CSE	CSE232 Discrete Mathematics 이산수학	→	<b>CSE Major Course to Basic Course</b> ITP112 Discrete Mathematics 이산수학
	CSE201 Digital Logic 디지털로직		EEE202 Digital Logic and Laboratory 디지털로직 및 실험
	CSE301 Computer Architecture 컴퓨터구조		CSE261 Computer Architecture 컴퓨터구조
	CSE462 Artificial Intelligence 인공지능		CSE362 Artificial Intelligence 인공지능
	CSE464 Software Engineering 소프트웨어공학		CSE364 Software Engineering 소프트웨어공학
	CSE341 Principles of Programming Languages 프로그래밍언어		CSE271 Principles of Programming Languages 프로그래밍언어
	CSE241 Object Oriented Programming 객체지향프로그래밍		CSE241 Advanced Programming 고급프로그래밍

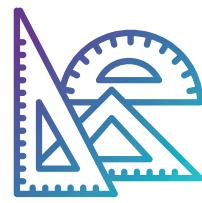
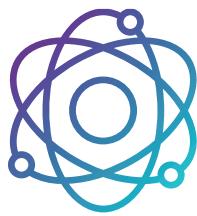
※ CSE track students(~2020) including old track can take newly opened CSE undergraduate courses to their own credits.

Department of Computer Science and Engineering

## 5. Curriculum Map [교육과정 이수 체계도]

Sophomore		Junior		Senior	
Spring	Fall	Spring	Fall	Spring	Fall
Advanced Programming	Data Structures	Software Engineering	Artificial Intelligence	Parallel Computing	Introduction to Compilers
System Programming	Computer Architecture	Introduction to Algorithms	Computer Networks	Machine Learning	Mobile Computing
	Principles of Programming Languages	Operating Systems	Theory of Computation	Computer Graphics	Cloud Computing
		Introduction to Human Computer Interaction	Database Systems	Computer Security	Information Visualization
				Intelligent Robots	Computer Vision

※ The opening semesters for each courses can be changed depending on the department's circumstances.



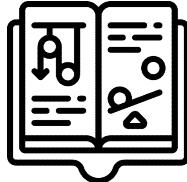
# **College of Natural Sciences**

## [자연과학대학]

# Department of Physics

## [물리학과]

### ■ Department Introduction [학과소개]



Physics forms a fundamental knowledge system and a framework of 'thinking' for almost every other contemporary science and technology. We incubate the next generation human resources to inherit and lead the diverse researches in modern physics by providing a set of related curriculums. In the physics track of UNIST, we offer not only basic physics courses such as classical mechanics, electromagnetism, quantum physics, statistical physics, mathematical physics and basic laboratory experiments, but also advanced courses for the future research such as solid state physics, optics, computational physics, plasma and beam physics, biological physics, particle physics, cosmology, advanced experiments, etc.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 30 Credits
	Elective 선택[학과 지정]	13 General Physics II(3), General Physics Lab II(1), Calculus II(3), Applied Linear Algebra(3), Differential Equations(3)	
Major 전공	Required 필수	24 Refer to Required course list below	At least 54 Credits
	Elective 선택	30 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	11 All Courses Accepted		At least 11 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			13 credits	13 credits	6 credits
1	MTH112	Calculus II (3)	●	●	○
2	PHY103	General Physics II (3)	●	●	●
3	CHM102	General Chemistry II (3)	○		
4	PHY108	General Physics Lab II (1)	●	●	●
5	CHM106	General Chemistry Lab II (1)	○		
6	MTH201	Differential Equations (3)	●	●	○
7	MTH203	Applied Linear Algebra (3)	●	●	○
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI112	Understanding Major Physics & Innovative Technology	○		

●: Required ○: Elective ◉: Recommended, ( ): credits

\* For Minor students, It is highly recommended to take Calculus II, Differential Equations, Applied Linear Algebra

\* General Physics 1, General Physics Lab 1 must be completed when Business administration field students plan to take Physics as their minor or double major.

## 3. Curriculum [물리학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Physics	24	30	54	18	18	36	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
PHY201	Classical Mechanics I 고전역학 I	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY203	Electromagnetism I 전자기학 I	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY301	Quantum Physics I 양자물리학 I	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY303	Thermal and Statistical Physics I 열 및 통계물리학 I	○	○	○	3-3-0	[PRE] PHY301	2
PHY207	Physics Lab I 물리학실험 I	○	○		3-1-4	[PRE] PHY101 PHY103	2
PHY213	Modern Physics 현대물리학	○	○		3-3-0	[PRE] PHY101 PHY103	2

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
PHY223	Mathematical Physics 수리물리학	○			3-3-0	[PRE] PHY201 PHY203	1
PHY311	Computational Physics 전산물리학	○			3-3-0		2
PHY490	Grauation Thesis 졸업논문	○			0 credit		1,2
	Total	24	18	12			

※ 복수전공 졸업논문 제외 8과목 중 최소 6과목(18학점)/부전공 졸업논문 제외 8과목 중 최소 4과목(12학점) 이수

Students pursuing a double major should take at least six courses (18 credits) out of eight, excluding Graduation Thesis. Students pursuing a minor should take at least four courses (12 credits) out of eight, excluding Graduation Thesis.

※ 구학제 학생들의 경우 창의시스템구현과 졸업논문 중 하나를 선택하여 이수

Students following the old curriculum may choose either an Interdisciplinary Project or Graduation Thesis.

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
PHY202	Classical Mechanics II 고전역학 II	○	○	○	3-3-0	[PRE] PHY201	2
PHY204	Electromagnetism II 전자기학 II	○	○	○	3-3-0	[PRE] PHY203	2
PHY208	Network Science for Complex Systems 복잡계 네트워크 사이언스 개론	○	○	○	3-3-0		2
PHY302	Quantum Physics II 양자물리학 II	○	○	○	3-3-0	[PRE] PHY301	2
PHY307	Physics Lab II 물리학실험 II	○	○	○	3-1-4	[PRE] PHY101 PHY103	1
PHY315	Solid State Physics I 고체물리학 I	○	○	○	3-3-0	[PRE] PHY301	2
PHY321	Optics 광학	○	○	○	3-3-0	[PRE] PHY203	2
PHY333	Astrophysics : Stars and Blackholes 천체물리학: 항성과 블랙홀	○	○	○	3-3-0	[PRE] PHY201	1
PHY334	Astrophysics : Galaxies and the Universe 천체물리학: 은하와 우주	○	○	○	3-3-0	[PRE] PHY201	-
PHY407	Semiconductor and Precision Measurement Physics 반도체 및 계측 물리학	○	○	○	3-2-2		1
PHY415	Solid State Physics II: Quantum Material 고체물리학 II: 양자물성	○	○	○	3-3-0	[PRE] PHY315	1
PHY418	Thermal and Statistical Physics II: Soft Matter Physics 열 및 통계물리학 II: 연성물질물리학	○	○	○	3-3-0	[PRE] PHY303	1
PHY425	Atomic and Molecular Physics 원자 및 분자물리학	○	○	○	3-3-0	[PRE] PHY301	-
PHY427	Introduction to Plasma Physics 플라즈마 물리학 입문	○	○	○	3-3-0	[PRE] PHY203 [IDEN] NE350	-
PHY428	Introduction to Beam Physics 빔 물리학 입문	○	○	○	3-3-0	[PRE] PHY203	-
PHY429	Nuclear and Elementary Particle Physics 핵 및 입자물리학	○	○	○	3-3-0	[PRE] PHY301, PHY313	-
PHY435	Biological Physics 생물물리학	○	○	○	3-3-0	[PRE] PHY303	1

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
PHY437	Nonlinear Dynamics 비선형동역학	○	○	○	3-3-0	[PRE] PHY201	-
PHY439	Introduction to Modern Theoretical Physics 현대이론물리학 입문	○	○	○	3-3-0	[PRE] PHY301, PHY313	-
PHY441	Fluid Physics 유체물리학	○	○	○	3-3-0	[PRE] PHY201	2
PHY471	Special Topics in Physics I 물리학 특강 I	○	○	○	3-3-0		-
PHY472	Special Topics in Physics II 물리학 특강 II	○	○	○	3-3-0		-
PHY473	Special Topics in Physics III 물리학 특강 III	○	○	○	3-3-0		-
MEN220	Fluid Mechanics 유체역학	○	○	○	3-3-0		2
MSE230	Introduction to Crystallography 결정학개론	○	○	○	3-3-0	[PRE] MSE202	2
MSE431	Introduction to Spintronics 스핀트로닉스개론	○	○	○	3-3-0		2
EEE331	Microwave Engineering 마이크로파공학	○	○	○	3-3-0	[PRE] EEE204	2
EEE441	Optoelectronics 광전자공학	○	○	○	3-3-0	[PRE] EEE204, EEE304	1
CSE463	Machine Learning 기계학습	○	○	○	3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	1
BME203	Introduction to Bioinformatics 생물정보학개론	○	○	○	3-3-0		1
BME219	Optical Imaging 광학이미징	○	○	○	3-3-0		2
BME321	Biomedical Optics 의광학개론	○	○	○	3-3-0		1
MTH204	Linear Algebra 선형대수학	○	○	○	3-3-0	[PRE] MTH201, MTH203	2
MTH251	Mathematical Analysis I 해석학 I	○	○	○	3-3-0		1
MTH271	Methods of Applied Mathematics 응용수학방법론	○	○	○	3-3-0		-
MTH313	Complex Analysis I 복소해석학 I	○	○	○	3-3-0		1
MTH321	Numerical Analysis 수치해석학	○	○	○	3-3-0	[PRE] MTH201, MTH203	2
MTH333	Scientific Computing 과학계산	○	○	○	3-3-0		-
MTH361	Mathematical Modeling and Applications 수리모형방법론	○	○	○	3-3-0		-
<b>Total</b>		<b>120</b>	<b>120</b>	<b>120</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

Department of Physics

## 4. Curriculum Change [교육과정 변경사항]

Major	2020	→	2021
PHY	PHY418 Polymer and Soft Matter Physics 고분자 및 연성물질물리학	→	PHY418 Thermal and Statistical Physics II : Soft Matter Physics 열 및 통계물리학 II: 연성물질물리학 (과목명 변경: Course Title Changed)
	PHY202 Classical Mechanics II 고전역학 II (1TR: Required, 2TR: Elective)		PHY202 Classical Mechanics II 고전역학 II (Elective, 전공 선택과목으로 변경)
	PHY204 Electromagnetism II 전자기학 II (1TR: Required, 2TR: Elective)		PHY204 Electromagnetism II 전자기학 II (Elective, 전공 선택과목으로 변경)
	PHY302 Quantum Physics II 양자물리학 II (1TR: Required, 2TR: Elective)		PHY302 Quantum Physics II 양자물리학 II (Elective, 전공 선택과목으로 변경)
	PHY307 Physics Lab II 물리학실험 II (1TR: Required, 2TR: Elective)		PHY307 Physics Lab II 물리학실험 II (Elective, 전공 선택과목으로 변경)

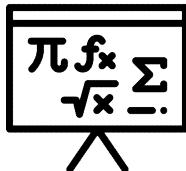
## 5. Curriculum Map [교육과정 이수 체계도]

Freshman		Sophomore		Junior		Senior	
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Required Basic Courses	Elective Basic Courses	Classical Mechanics I	Classical Mechanics II	Quantum Physics I	Quantum Physics II	Thermal and Statistical Physics II	Fluid Physic
	General Physics II	Electro-magnetism I	Electro-magnetism II	Computational Physics	Thermal and Statistical Physics I	Introduction to Plasma Physics	Nuclear and Elementary Particle Physics
	General Physics Lab II	Modern Physics	Mathematical Physics	Physics Lab II	Solid State Physics I	Biological Physics	Introduction to Beam Physics
	Calculus II	Applied Linear Algebra	Physics Lab I	Astrophysics :Stars and Blackholes	Astrophysics :Galaxies and the Universe	Solid Physics II :Quantum Materilas	Introduction to Theoretical Physics
		Differential Equations	Network Science for Complex Systems		Optics	Nonlinear Dynamics	
						Atomic and Molecular Physics	
						Semiconductor and Precision Measurement Physics	

# Department of Mathematical Sciences

## [수리과학과]

### ■ Department Introduction [학과소개]



Department of Mathematical Science explores the connections between mathematics and its applications at both the research and educational levels. In addition to focusing on traditional study in pure mathematics, our research at UNIST is devoted to encompass some of the most diverse and interdisciplinary research in the physical, business, economics, engineering, and biological sciences. The department provides a dynamic and engaging research environment in scientific computing, mathematical biology, finance, dynamical systems, image processing, number theory and analysis in PDEs. The undergraduate and graduate curriculum is planned with the following varied objectives: (1) to offer students an introduction to the fundamental study of quantity, structure, space, and change; (2) to prepare students for graduate study in pure or applied mathematics; (3) to serve the needs of students in fields that rely substantially on mathematics, such as the physics, biology, engineering, business and economics.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 33 Credits
	Elective 선택[학과 지정]	16 Differential Equations (3), Applied Linear Algebra (3), Statistics (3), Introduction to AI Programming II(3), Calculus II(3), Understanding Major(1)	
Major 전공	Required 필수	30 Refer to Required course list below Graduation thesis required(No credits for thesis)	At least 54 Credits
	Elective 선택	24 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	11	All Course Accepted	At least 11 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

Department of Mathematical Sciences

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			16 credits	15 credits	12 credits
1	MTH112	Calculus II (3)	●	●	●
2	PHY103	General Physics II (3)			
3	CHM102	General Chemistry II (3)			
4	PHY108	General Physics Lab II (1)			
5	CHM106	General Chemistry Lab II (1)			
6	MTH201	Differential Equations (3)	●	●	●
7	MTH203	Applied Linear Algebra (3)	●	●	●
8	MTH211	Statistics (3)	●	●	●
9	MGT102	Entrepreneurship (3)			
10	IE101	Introduction to Data Science(3)			
11	ITP117	Introduction to AI Programming II (3)	●	●	
12	ITP111	Probability & Random Process (3)			
13	ITP112	Discrete Mathematics (3)			
14	UNI113	Understanding Major (1) <b>Introduction to Modern Mathematics</b>	●		

●: Required ○: Elective ◉: Recommended, ( ): credits

## 3. Curriculum [수리과학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Mathematical Sciences	30	24	54	15	21	36	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Seme ster
MTH251	Mathematical Analysis I 해석학 I	○	○	○	3-3-0		1
MTH302	Modern Algebra I 현대대수학 I	○	○	○	3-3-0	Recommended Course*: MTH230	1
MTH313	Complex Analysis I 복소해석학 I	○	○	○	3-3-0	Recommended Course: MTH251	1
MTH351	General Topology 위상수학	○	○	○	3-3-0	[PRE] MTH251 Recommended Course*: MTH230	2
MTH204	Linear Algebra 선형대수학	○	○	○	3-3-0	[PRE] MTH201,MTH203	2
MTH252	Mathematical Analysis II 해석학 II	○	○	○	3-3-0	[PRE] MTH203,MTH251	2
MTH315	Ordinary Differential Equations 상미분방정식론	○	○	○	3-3-0	[PRE] MTH201,MTH203	2
MTH321	Numerical Analysis 수치해석학	○	○	○	3-3-0	[PRE] MTH201,MTH203	2
MTH342	Probability 확률론	○	○	○	3-3-0		2

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
MTH421	Introduction to Partial Differential Equations 편미분방정식개론	○	○	○	3-3-0	[PRE] MTH201,MTH203 Recommended Course: MTH315, MTH251	1
MTH490	Graduation Thesis 졸업논문	○			0 credit		1,2
	Total	30	30	30			

\* It is highly recommended to register the subject related to academic connectivity.

※ If you have taken more than five required courses (15 credits) in the case of a Double major, the excess credits can be replaced with major elective credits. For minor, if you have taken more than four courses (12 credits) required for your major, the excess credits can be replaced with major elective credits.

※ 복수전공은 전공필수 과목을 5과목(15학점)을 초과하여 수강한 경우, 초과 학점은 전공선택 학점으로 대체 가능. 부전공은 전공필수 과목을 4과목(12 학점)을 초과하여 수강한 경우, 초과 학점은 전공선택 학점으로 대체 가능

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
MTH230	Set Theory 집합론	○	○	○	3-3-0		1
MTH260	Elementary Number Theory 정수론	○	○	○	3-3-0		2
MTH271	Methods of Applied Mathematics 응용수학방법론	○	○	○	3-3-0	Recommended course: MTH203	-
MTH281	Discrete Mathematics 이산수학	○	○	○	3-3-0		-
MTH303	Modern Algebra II 현대대수학 II	○	○	○	3-3-0	[PRE] MTH302	2
MTH314	Complex Analysis II 복소해석학 II	○	○	○	3-3-0	[PRE] MTH313 Recommended Course: MTH251,MTH252	2
MTH330	Introduction to Geometry 기하학 개론	○	○	○	3-3-0		-
MTH333	Scientific Computing 과학계산	○	○	○	3-3-0		-
MTH343	Financial Mathematics 금융수학	○	○	○	3-3-0		1
MTH344	Mathematical Statistics 수리통계학	○	○	○	3-3-0		-
MTH361	Mathematical Modeling and Applications 수리모형방법론	○	○	○	3-3-0	[PRE] MTH201, MTH203	1
MTH401	Real Analysis 실해석학	○	○	○	3-3-0	[PRE] MTH251,MTH351	1
MTH403	Probability and Stochastic Processes 확률 및 확률 과정론	○	○	○	3-3-0		2
MTH405	Numerical Analysis and Applications 수치해석 및 응용	○	○	○	3-3-0		1
MTH412	Dynamical Systems 동적 시스템	○	○	○	3-3-0	[PRE] MTH251	1
MTH413	Differential Geometry I 미분기하학 I	○	○	○	3-3-0		1
MTH414	Differential Geometry II 미분기하학 II	○	○	○	3-3-0	[PRE]MTH413	-

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remarks	Semester
MTH415	Numerical Methods for Partial Differential Equations I 편미분방정식의 수치방법 I	○	○	○	3-3-0		2
MTH420	Fourier Analysis 푸리에 해석학	○	○	○	3-3-0	[PRE] MTH251 Recommended Course: MTH313	2
MTH432	Algebraic Topology 대수위상	○	○	○	3-3-0	[PRE] MTH112,MTH351 Recommended Course: MTH302	-
MTH461	Stochastic Processes 확률과정론	○	○	○	3-3-0	[PRE] MTH342	-
MTH480	Topics in Mathematics I 수학 특강 I	○	○	○	3-3-0		-
MTH481	Topics in Mathematics II 수학 특강 II	○	○	○	3-3-0		-
PHY201	Classical Mechanics I 고전역학 I	○			3-3-0	[PRE] PHY101, PHY103	1
PHY223	Mathematical Physics 수리물리학	○			3-3-0	[PRE] PHY201, PHY203	1
PHY437	Nonlinear Dynamics 비선형동역학	○			3-3-0	[PRE]PHY201	-
MEN220	Fluid Mechanics 유체역학	○			3-3-0		2
MEN301	Numerical Analysis 수치해석	○			3-3-0	[PRE] MTH201	2
MEN302	Introduction to Finite Element Method 유한요소법개론	○			3-3-0	[PRE] MEN231	2
CSE463	Machine Learning 기계 학습	○			3-3-0	[PRE] CSE221, MTH203, MTH112, ITP111	-
FIA331	Introduction to Financial Engineering 금융공학개론	○			3-3-0	[PRE] MGT207	-
IE201	Operations Research I 계량경영학 I	○			3-3-0		2
IE412	Advanced Investment Science 고급계량투자론	○			3-3-0	[PRE] IE314	1
<b>Total</b>		<b>99</b>	<b>69</b>	<b>69</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020		2021
MTH	MTH413 Differential Geometry I 미분기하학I (Required)	→	MTH413 Differential Geometry I 미분기하학I (Elective)

#### 5. Curriculum Map [교육과정 이수 체계도]

2학년 1학기 Sophomore Spring	2학년 2학기 Sophomore Fall	3학년 1학기 Junior Spring	3학년 2학기 Junior Fall	4학년 1학기 Senior Spring	4학년 2학기 Senior Fall
미분방정식* Differential Equation*	응용수학방법론 Methods of Applied Mathematics	수리모형방법론 Mathematical Modeling and Applications	상미분방정식론* Ordinary Differential Equations* 수치해석학* Numerical Analysis*	편미분방정식 개론* Introduction to Partial Differential Equations* 동적시스템 과학계산 Dynamical Systems	
응용선형대수* Applied Linear Algebra* 이산수학 Discrete Mathematics	선형대수학* Linear Algebra*	현대대수학* Modern Algebra I * 집합론 Set Theory	위상수학* General Topology* 현대대수학 II Modern Algebra II 기하학 개론 Introduction to Geometry 정수론 Elementary Number Theory	미분기하학I Differential Geometry I 대수위상 Algebraic Topology	미분기하학II Differential Geometry II
해석학I* Mathematical Analysis I*	해석학II* Mathematical Analysis II*	복소해석학I* Complex Analysis I*	복소해석학II Complex Analysis II		푸리에 해석학 Fourier Analysis
	통계학* Statistics *	금융수학 Financial Mathematics	확률론* Probability *	수리통계학 Mathematical Statistics	확률과정론 Stochastic Processes
				수학특강I Topics in Mathematics I	수학 특강II Topics in Mathematics II

# Department of Chemistry

## [화학과]

### ■ Department Introduction [학과소개]



Chemistry is a central science that seeks the understanding of nature and interactions between atoms and molecules. In addition to this essential scientific question, modern development such as nanoscience offers new chances to explore the world of 'beyondatoms and molecules. The department offers lectures and experimental courses in all fields of chemistry: physical, organic, analytical, biological, and materials/polymers chemistry. The department stresses a research experience as an essential educational tool. Research opportunities with our world-class researchers are provided to all undergraduate students in the state-of-the art facilities and environment.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	17 Calculus I(3), General Physics I(3), General Chemistry I(3), General Biology(3), Introduction to AI Programming I(3), General Chemistry Lab I(1), General Physics Lab I(1) (Total 17 credits)	At least 31 Credits
	Elective 선택[학과 지정]	14 General Chemistry II(3), General Chemistry Lab II(1), General Physics II(3), AIP II(3), Calculus II(3), Why Chemistry?(1)	
Major 전공	Required 필수	30 Refer to Required course list below Including 3 Credits of Graduation Thesis	At least 54 Credits
	Elective 선택	24 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	11	All courses accepted	At least 11 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			14 credits	14 credits	3 credits
1	MTH112	Calculus II (3)	●	●	
2	PHY103	General Physics II (3)	●	●	
3	CHM102	General Chemistry II (3)	●	●	●
4	PHY108	General Physics Lab II (1)	○		
5	CHM106	General Chemistry Lab II (1)	●	●	
6	MTH201	Differential Equations (3)	○		
7	MTH203	Applied Linear Algebra (3)	○		
8	MTH211	Statistics (3)	○		
9	MGT102	Entrepreneurship (3)	○		
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	●	●	
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	UNI114	Understanding Major Why Chemistry?	●	●	

●: Required ○: Elective ◉: Recommended, ( ): credits

\* General Chemistry 1, General Chemistry Lab 1 must be completed when Business administration field students plan to take Chemistry as their minor or double major.

## 3. Curriculum [화학과 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
Department of Chemistry	30	24	54	18	18	36	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
CHM201	Organic Chemistry Lab 유기화학실험	○			2-0-4		2
CHM211	Organic Chemistry I 유기화학 I	○	○	○	3-3-0	[IDEN] ECHE201	1,2
CHM212	Organic Chemistry II 유기화학 II	○	○	○	3-3-0	[IDEN] ECHE202	1,2
CHM231	Physical Chemistry I 물리화학 I	○	○	○	3-3-0	[IDEN] ECHE203	1
CHM232	Physical Chemistry II 물리화학 II	○	○	○	3-3-0		2
CHM291	Analytical Chemistry I 분석화학 I	○	○		3-3-0	[IDEN] ECHE213	1
CHM301	Inorganic Chemistry Lab 무기화학실험	○			2-0-4		1

Department of Chemistry

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
CHM302	Physical Chemistry Lab 물리화학실험	○			2-0-4		2
CHM321	Biochemistry I 생화학 I	○			3-3-0	[IDEN] BIO211	1
CHM351	Inorganic Chemistry I 무기화학 I	○	○		3-3-0	[IDEN] ECHE304	1
CHM400	Thesis 졸업논문	○			3-0-6		1,2
	Title	30	18	12			

※ 복수전공 졸업논문 제외 10과목 중 최소 6과목(18학점)/부전공 졸업논문 제외 10과목 중 최소 4과목(12학점) 이수

Students pursuing a double major should take at least six courses (18 credits) out of ten, excluding Graduation Thesis. Students pursuing a minor should take at least four courses (12 credits) out of ten, excluding Graduation Thesis.

※ 2020년 입학생부터 졸업논문 이수, 2020년 이전 입학생은 기존 창의시스템구현 이수

Students entering from 2020 should take Graduation Thesis. Students entered before 2020 should take Interdisciplinary Project.

### ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
CHM303	Analytical/Materials Chemistry Lab 분석재료화학실험	○	○	○	2-0-4		2
CHM311	Synthetic Organic Chemistry 합성유기화학	○	○	○	3-3-0		1
CHM313	Fundamental of Energy Materials 에너지재료개론	○	○	○	3-3-0	[IDEN] ECHE317	1
CHM322	Biochemistry II 생화학 II	○	○	○	3-3-0	[IDEN] BIO221	2
CHM323	Medicinal Chemistry 의약화학	○	○	○	3-3-0	[PRE] CHM211 CHM212	2
CHM324	Spectroscopy in Organic Chemistry 유기분광학	○	○	○	3-3-0		2
CHM333	Physical Chemistry III 물리화학 III	○			3-3-0		1
CHM335	Quantum Chemistry 양자화학	○	○	○	3-3-0		1
CHM336	Chemical Thermodynamics 화학열역학	○	○	○	3-3-0		-
CHM337	Computational Chemistry 전산화학	○	○	○	3-3-0		2
CHM352	Inorganic Chemistry II 무기화학 II	○			3-3-0	[IDEN] ECHE326	2
CHM371	Introduction to Nanochemistry 나노화학개론	○	○	○	3-3-0	[IDEN] ECHE416	2
CHM372	Introduction to Polymer Chemistry 고분자화학개론	○	○	○	3-3-0	[IDEN] ECHE351 MSE270	2
CHM391	Instrumental Analysis 기기분석	○			3-3-0	[IDEN] ECHE322	2
CHM401	Special Topics in Chemistry I 화학특론 I	○			3-3-0		
CHM402	Special Topics in Chemistry II 화학특론 II	○			3-3-0		

Course Code	Course Title	Major	Double	Minor	Cred. -Lect. -Exp.	Remark	Semester
CHM403	Special Topics in Chemistry III 화학특론 III	○			3-3-0		
CHM421	Introduction to Chemical Biology 화학생물학개론	○	○		3-3-0		-
CHM422	Introduction to Supramolecular Chemistry 초분자화학개론	○	○		3-3-0		1
CHM431	Introduction to Molecular Spectroscopy 기초분자분광학	○	○		3-3-0		2
CHM433	Solid State Physical Chemistry 고체물리화학	○	○		3-3-0		1
CHM451	Inorganic Materials Analysis 무기재료분석	○	○		3-3-0		2
CHM452	Organometallic Chemistry 유기금속화학	○	○		3-3-0		2
CHM453	Bioinorganic Chemistry 생무기화학	○	○		3-3-0		1
CHM454	Solid State Chemistry 고체화학	○	○		3-3-0	[IDEN] ECHE313	1
CHM455	Crystallography 결정학	○	○		3-3-0		2
CHM471	Block Copolymers 블록 코폴리머	○	○		3-3-0		-
CHM473	Nanomaterials Chemistry 나노재료화학	○	○		3-3-0		1
CHM474	Advanced Polymer Chemistry 고급고분자화학	○	○		3-3-0		1
PHY201	고전역학 I (Classical Mechanics I)	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY203	전자기학 I (Electromagnetism I)	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY204	전자기학 II (Electromagnetism II)	○	○	○	3-3-0	[PRE] PHY203	2
PHY301	양자물리학 I (Quantum Physics I)	○	○	○	3-3-0	[PRE] PHY101, PHY103	1
PHY302	양자물리학 II (Quantum Physics II)	○	○	○	3-3-0	[PRE] PHY101, PHY103	2
PHY303	열 및 통계물리학 I (Thermal and Statistical Physics I)	○	○	○	3-3-0	[PRE] PHY301	2
PHY311	전산물리학 (Computational Physics)	○	○	○	3-3-0		2
PHY313	수리물리학 (Mathematical Physics)	○	○	○	3-3-0	[PRE] PHY201, PHY203	1
PHY315	고체물리학 I (Solid State Physics I)	○	○	○	3-3-0	[PRE] PHY301	2
PHY321	광학 (Optics)	○	○	○	3-3-0	[PRE] PHY203	2
PHY415	고체물리학 II : 양자물성 (Solid State Physics II : Quantum Material)	○	○	○	3-3-0	[PRE] PHY315	1
PHY425	원자 및 분자물리학 (Atomic and Molecular Physics)	○	○	○	3-3-0	[PRE] PHY301	-
PHY435	생물물리학 (Biological Physics)	○	○	○	3-3-0	[PRE] PHY303	1

Course Code	Course Title	Major	Double	Minor	Cred.-Lect.-Exp.	Remark	Semester
MTH313	복소해석학 I (Complex Analysis I)	○	○	○	3-3-0		1
MTH420	푸리에 해석학 (Fourier Analysis)	○	○	○	3-3-0	[PRE] MTH251	2
ECHE312	전기화학 (Electrochemistry)	○	○	○	3-3-0		1
ECHE413	신에너지 변환 및 저장개론 (Introduction to New Energy Conversion and Storage)	○	○	○	3-3-0		2
ECHE312	전기화학 (Electrochemistry)	○	○	○	3-3-0		1
ECHE240	공학생화학 (Engineering Biochemistry)	○	○	○	3-3-0		2
ECHE431	촉매개론 (Introduction to Catalysis)	○	○	○	3-3-0		2
UEE211	환경화학 (Environmental Chemistry)	○	○	○	3-3-0		1
UEE206	과학인문학 (Science Humanities)	○	○	○	3-3-0		1
BIO201	분자생물학 (Molecular Biology)	○	○	○	3-3-0		2
BIO231	생명현상의 화학적 이해 (The Chemical Basis of Life)	○	○	○	3-3-0		2
BIO307	현대생명과학동향 (Current Topics in Biological Sciences)	○	○	○	3-3-0		1,2
<b>Title</b>		<b>162</b>	<b>144</b>	<b>108</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

### ※ Identical Courses [동일지정교과]

Department	Identical Course 1	↔	Department(School)	Identical Course 2
Chemistry	CHM211 Organic Chemistry I 유기화학1	↔	Energy and Chemical Engineering	ECHE201 Organic Chemistry I 유기화학 I
	CHM212 Organic Chemistry II 유기화학2			ECHE202 Organic Chemistry II 유기화학II
	CHM231 Physical Chemistry I 물리화학1			ECHE203 Physical Chemistry I 물리화학1
	CHM291 Analytical Chemistry I 분석화학I			ECHE213 Analytical Chemistry 분석화학
	CHM313 Fundamentals of Energy Materials 에너지재료개론			ECHE317 Fundamentals of Energy Materials 에너지재료개론
	CHM351 Inorganic Chemistry I 무기화학I			ECHE304 Inorganic Chemistry I 무기화학 I
	CHM352 Inorganic Chemistry II 무기화학2			ECHE326 Inorganic Chemistry II 무기화학2
	CHM371 Introduction to Nanochemistry 나노화학개론			ECHE416 Introduction to Nanoscience and Nanotechnology 나노과학 및 기술
	CHM391			ECHE322

	Instrumental Analysis 기기분석		Instrumental Analysis 기기분석
Chemistry	CHM372 Introduction to Polymer Chemistry 고분자화학개론	Energy and Chemical Engineering	ECHE351 Introduction to Polymer Science and Engineering 고분자과학개론
	CHM454 Solid State Chemistry 고체화학	Materials Science and Engineering	MSE270 Introduction to Polymer Materials 고분자재료개론
		Energy and Chemical Engineering	ECHE313 Solid State Chemistry 고체화학

#### 4. Curriculum Change [교육과정 변경사항]

Major	2020	2021
CHM	CHM473 Nanomaterials Chemistry 나노재료화학	CHM473 Introduction to Materials Chemistry 재료화학개론 (과목명 변경: Course Title Changed)
	CHM352 Inorganic Chemistry II 무기화학 (Required)	CHM352 Inorganic Chemistry II 무기화학 (Elective, 전공 선택과목으로 변경)
	CHM391 Instrumental Analysis 기기분석 (Required)	CHM391 Instrumental Analysis 기기분석 (Elective, 전공 선택과목으로 변경)
	CHM302 Physical/Analytical Chemistry Lab 물리분석화학실험	CHM302 Physical Chemistry Lab 물리화학실험 (과목명 변경: Course Title Changed)

Department of Chemistry

## 5. Curriculum Map [교육과정 이수 체계도]

### 〈Organic Chemistry〉

Semester 1 Sophomore	Semester 2 Sophomore	Semester 1 Junior	Semester 2 Junior	Semester 1 Senior	Semester 2 Senior
PhyChem I	PhyChem II	Synth Org Chem	Spec in Org Chem (or Senior)	Intro Supra Mole. Chem	Medicinal Chem (or Junior)
OrgChem 1	OrgChem II	BioChem I	BioChem II	Fun Energy Mat (or Junior)	Instrumental Analysis (or Junior)
AnalyChem	OrgChem Exp	InorgChem I	Intro PolymerChem (or Senior)	Quantum Chem	Organometal Chem
	AnalChem Lab	PhyChem II	InorgChem II		Comp Chem
		InorgChem Exp	PhysChem Lab		Thesis

### 〈Materials Chemistry〉

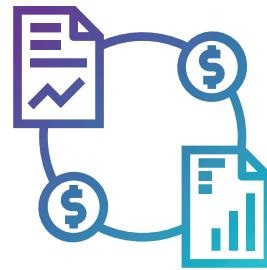
Semester 1 Sophomore	Semester 2 Sophomore	Semester 1 Junior	Semester 2 Junior	Semester 1 Senior	Semester 2 Senior
PhyChem I	PhyChem II	InorgChem I	InorgChem II	Nanomat Chem	Inorg Mater Analysis
OrgChem 1	OrgChem II	BioChem I	BioChem II	Fun Energy Mat	Instrumental Analysis
AnalyChem	OrgChem Exp	PhyChem II	Intro to Nanochem	Solid State Phy Chem	Crystallography
	AnalChem Lab	InorgChem Exp	Intro PolymerChem		Comp Chem
			PhysChem Lab		Thesis

## 〈Physical Chemistry〉

Semester 1 Sophomore	Semester 2 Sophomore	Semester 1 Junior	Semester 2 Junior	Semester 1 Senior	Semester 2 Senior
PhyChem I	PhyChem II	InorgChem I	Comp Chem	Introduction to Molecular Spectroscopy	Instrumental Analysis
OrgChem 1	OrgChem II	BioChem I	PhyChem Exp	Solid State Phy Chem	Introduction to Nanochemistry
AnalyChem	OrgChem Exp	InorgChem Exp	Optics	Quantum Physics I	Comp Chem
Applied Linear Algebra	Electromagnetism I	PhyChem III		Fundamental of Energy Materials	Thesis
	AnalChem Lab	Quantum Chem			

## 〈Inorganic Chemistry〉

Semester 1 Sophomore	Semester 2 Sophomore	Semester 1 Junior	Semester 2 Junior	Semester 1 Senior	Semester 2 Senior
PhyChem I	PhyChem II	InorgChem I	InorgChem II	Introduction to Supra. Chem	Inorg Mater Analysis
OrgChem 1	OrgChem II	BioChem I	Bioinorganic chem	Nanomaterials Chem	Instrumental Analysis
AnalyChem	OrgChem Exp	PhyChem III	Intro to Nanochem	Solid State Phy Chem	Crystallography
	AnalChem Lab	InorgChem Exp	Organometallic Chem	Fun Energy Mat	Comp Chem
		PhysChem Lab			Thesis



**School of**  
**Business Administration**  
**[경영과학부]**

# School of Business Administration

## [경영과학부]

### ■ Department Introduction [학과소개]



The mission of the UNIST School of Business Administration (SBA) is to educate and develop leaders and enterprise builders, who create new wealth by integrating science & technology with business management. The academic curriculum of the School is specifically tailored to accomplish this mission by offering focus courses in critical-thinking, data analytics, and entrepreneurship as well as a variety of courses in conventional management. Through our rigorous and contemporary curriculum, students will build a strong theoretical foundation and gain the agility to pursue myriad options on the path to becoming influential leaders and business champions, who will create a better world.

The School of Business Administration boasts faculty members who have obtained Ph.D. degrees from prominent institutions. Their courses enable students to acquire expert business knowledge by emphasizing individual, experiential, and team-based learning. Specifically, by offering courses taught in English, students develop the confidence to effectively communicate their ideas in the international language of commerce. With the smallest faculty-student ratio in South Korea, research and education are more personalized, relevant, and forward-thinking, and collaborations between faculty and students are more productive.

Our students can enjoy various benefits, to wit: 1) receive world-class education; 2) participate in research with faculty members; 3) study abroad; 4) sign-up for practice-based or research-based internship programs; 5) receive scholarship for almost all students; and 6) live in dormitory complexes. The School of Business Administration provides a transformational experience, enabling students to realize their full potential.

In 2018, the UNIST SBA received AACSB (Association to Advance Collegiate School of Business) International Accreditation, which means that our programs at the bachelor's, master's, and doctoral levels have proven to be among the top 5 percent in business education worldwide. We hope that all young people who dream of becoming a global leader in the field of research or practice in cutting-edge new industries can join the UNIST SBA to leap together.

### 1. Graduation Requirement [졸업 이수요건]

Category 구분	Credits 이수학점	Remarks 비고	Subtotal 소계
Basic 기초	Required 필수	9 Required: Calculus I (3), Introduction to AI Programming I (3) Elective: Choose 1 among General Physics I(3), General Chemistry I(3), General Biology(3) (Total 9 credits)	At least 28 Credits
	Elective 선택[학과 지정]	19 Required: Applied Linear Algebra(3), Statistics(3), Entrepreneurship(3), Economics(3), Principles of Management(1) Elective: Calculus II(3), Differential Equations(3), Introduction to Data Science(3), AIP II (3), Discrete Mathematics(3), Probability&Random Process(3)	
Major 전공	Required 필수	21 Refer to Required course list below	At least 48 Credits
	Elective 선택	27 Refer to Elective course list below	
	Internship 인턴십	3 Internship (Choose one among Research, Industrial, Venture Creation, Co-op)	3 Credits
Free Elective 자유선택	21	All Courses Accepted	At least 21 Credits

\* For Liberal Arts and Leadership requirements, refer to school Common requirements

School of Business Administration

## 2. Basic Requirements [기초 이수요건]

No.	Course Code	Course Title	Major 전공	Double Major 복수전공	Minor 부전공
			19 credits	10 credits	-
1	MTH112	Calculus II (3)	○		
2	PHY103	General Physics II (3)			
3	CHM102	General Chemistry II (3)			
4	PHY108	General Physics Lab II (1)			
5	CHM106	General Chemistry Lab II (1)			
6	MTH201	Differential Equations (3)	○		
7	MTH203	Applied Linear Algebra (3)	●		
8	MTH211	Statistics (3)	●	●	
9	MGT102	Entrepreneurship (3)	●	●	
10	IE101	Introduction to Data Science(3)	○		
11	ITP117	Introduction to AI Programming II (3)	○		
12	ITP111	Probability & Random Process (3)	○		
13	ITP112	Discrete Mathematics (3)	○		
14	MGT106	Economics(3)	●	●	
15	UNI115	Understanding Major Principles of Management	●	●	

●: Required ○: Elective ◉: Recommended, ( ) : credits

## 3. Curriculum [경영과학부 교육과정]

### ▶ Credit Requirements [이수학점]

Department (School)	Major(전공)			Double Major(복수전공)			Minor(부전공)		
	R	E	Total	R	E	Total	R	E	Total
School of Business Administration	21	27	48	21	15	36	12	6	18

\*R: Required, E: Elective

### ▶ Required [전공필수]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
MGT201	Management Information Systems 경영정보론	○	○	○	3-3-0		2
MGT202	Organizational Behavior 조직행동론	○	○	○	3-3-0		1
MGT204	Marketing Management 마케팅관리	○	○	○	3-3-0		1
MGT205	Financial Accounting 재무회계	○	○	○	3-3-0		1
MGT207	Financial Management 재무관리	○	○	○	3-3-0		1
MGT209	Operations Management 생산운영관리	○	○	○	3-3-0		1
MGT499	Strategic Management 경영전략	○	○	○	3-3-0		1
Total		21	21	21			

## ▶ Elective [전공선택]

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
MGT101	Business Communication & Leadership 비즈니스커뮤니케이션 & 리더십	○	○	○	3-3-0		1
MGT203	International Business 국제경영학	○	○	○	3-3-0		-
MGT206	Managerial Accounting 관리회계	○	○	○	3-3-0	[PRE] MGT205	-
MGT210	Data Analysis & Decision Making 경영통계분석	○	○	○	3-3-0	[PRE] MTH211	1
MGT211	Microeconomics 미시경제학	○	○	○	3-3-0	[PRE] MGT106	2
MGT302	Human Resource Management 인사관리	○	○	○	3-3-0	[PRE] MGT202	2
MGT303	Strategic Human Resource Management 전략적 인적자원 관리	○	○	○	3-3-0		-
MGT306	Business Ethics 기업경영윤리	○	○	○	3-3-0		-
MGT312	Macroeconomics 거시경제학	○	○	○	3-2-2	[PRE] MGT211	1
MGT315	Econometrics 계량경제학	○	○	○	3-3-0	[PRE] MTH211	1
MGT317	International Economics 국제경제학	○	○	○	3-3-0	[PRE] MGT312	2
MGT330	Consumer Behavior 소비자행동	○	○	○	3-3-0	[PRE] MGT204	-
MGT331	International Marketing 국제마케팅	○	○	○	3-3-0	[PRE] MGT204	2
MGT332	Brand Management 브랜드관리론	○	○	○	3-3-0	[PRE] MGT204	-
MGT361	Technology Management 기술경영	○	○	○	3-3-0		-
MGT363	Operations Research 계량경영학	○	○	○	3-3-0		2
MGT367	Business Data Science 비즈니스 데이터 사이언스	○	○	○	3-3-0	[PRE] MTH211	1
MGT372	Internet Business and Marketing 인터넷 비즈니스	○	○	○	3-3-0		-
MGT380	Supply Chain Management 공급망관리	○	○	○	3-3-0		-
MGT410	Special Topics in MGT I 경영과학특론 I	○	○	○	1-1-0		2
MGT411	Special Topics in MGT II 경영과학특론 II	○	○	○	2-2-0		-
MGT412	Special Topics in MGT III 경영과학특론 III	○	○	○	3-3-0		-
MGT432	Marketing Research 마케팅조사론	○	○	○	3-3-0	[PRE] MTH211	1
MGT433	Advertising Management 광고관리론	○	○	○	3-3-0	[PRE] MGT204	-
MGT466	Business AI 비즈니스 AI	○	○	○	3-3-0	[PRE] MTH211, MGT367	2
MGT471	Managing Innovation and Change 혁신과 변화의 관리	○	○	○	3-3-0		1
MGT473	Entrepreneurship and Venture Management 창업과 벤처	○	○	○	3-3-0		-
MGT491	Independent Study 개별연구	○	○	○	3-3-0		-

Course Code	Course Title	Major	Double	Minor	Cred -Lect -Exp	Remark	Semester
FIA301	Investments 투자론	○	○	○	3-3-0	[PRE] MTH211	2
FIA303	Futures and Option 선물과 옵션	○	○	○	3-3-0	[PRE] MGT207	1
FIA304	International Finance 국제재무관리	○	○	○	3-3-0	[PRE] MGT207	-
FIA305	Corporate Finance 기업재무론	○	○	○	3-3-0	[PRE] MGT207	1
FIA321	Intermediate Accounting 1 중급회계1	○	○	○	3-3-0	[PRE] MGT205	-
FIA331	Introduction to Financial Engineering 금융공학개론	○	○	○	3-3-0	[PRE] MGT207	2
FIA332	Quantitative Finance 계량재무론	○	○	○	3-3-0	[PRE] MGT207	1
FIA402	Fixed Income Securities 채권투자	○	○	○	3-3-0	[PRE] MGT207	1
FIA404	Risk Management 리스크관리	○	○	○	3-3-0	[PRE] MGT207	2
FIA417	Financial Markets and Trading 증권시장론	○	○	○	3-3-0	[PRE] MGT207	1
FIA418	Venture Finance 벤처파이낸스	○	○	○	3-3-0	[PRE] MGT207	-
FIA431	Financial Time-series Analysis 금융시계열 분석	○	○	○	3-3-0	[PRE] MTH211	2
FIA441	Financial Statement Analysis 재무제표분석	○	○	○	3-3-0	[PRE] MGT205	2
FIA443	Cost Accounting 원가관리전략	○	○	○	3-3-0	[PRE] MGT206	-
FIA450	Data Science for finance 금융빅데이터 분석	○	○	○	3-3-0		2
MTH342	Probability 확률론	○	○	○	3-3-0		-
<b>Total</b>		<b>132</b>	<b>132</b>	<b>132</b>			

\*[PRE]: Prerequisite(선이수), [IDEN]: Identical(동일지정교과)

#### 4. Curriculum Change [교육과정 변경사항]

Track	2020	→	2021
MGT	⟨NEW⟩	→	MGT380(Elective) Supply Chain Management 공급망관리
	⟨NEW⟩		FIA450(Elective) Data Science for finance 금융 빅데이터 분석
	MGT201(Required) Dynamics of IT Dynamics of IT		MGT201(Required) Management Information Systems 경영정보론
	MGT308(Required) Strategic Management 경영전략		MGT499(Required) Strategic Management 경영전략
	MGT367(Elective) Data Science for business 비즈니스를 위한 데이터 사이언스		MGT367(Elective) Business Data Science 비즈니스 데이터 사이언스
	MGT410(Elective) / 3Credits Special Topics in MGT I MGT 특론 I		MGT410(Elective) / 1Credits Special Topics in Management I 경영과학특론 I
	MGT411(Elective) / 3Credits Special Topics in MGT II MGT 특론 II		MGT411(Elective) / 2Credits Special Topics in Management II 경영과학특론 II

Track	2020	→	2021
MGT	MGT412(Elective) Special Topics in MGT III MGT 특론III	→	MGT412(Elective) Special Topics in Management III 경영과학특론III
	MGT466(Elective) Advanced Business Analytics with AI 인공지능을 활용한 고급 비즈니스 분석 방법론		MGT466(Elective) Business AI 비즈니스 AI
	MGT304(Elective) Diversity Management 인력 다양성 관리		⟨Closed⟩
	MGT307(Elective) Legal Environment of Business 경영과 법률 환경		⟨Closed⟩
	MGT362(Elective) Process & Quality Management 생산과 품질 관리		⟨Closed⟩
	MGT364(Elective) Database 데이터베이스		⟨Closed⟩
	MGT366(Elective) Advanced Business Programming 고급 경영 프로그래밍		⟨Closed⟩
	MGT373(Elective) Strategic Management of IT 정보기술과 경영전략		⟨Closed⟩
	MGT413(Elective) Game Theory 게임 이론		⟨Closed⟩
	MGT414(Elective) MGT특론 IV Special Topics in MGT IV		⟨Closed⟩
	MGT441(Elective) Global Business Strategy 글로벌경영전략		⟨Closed⟩
	MGT463(Elective) Simulation 시뮬레이션		⟨Closed⟩
	MGT464(Elective) Stochastic Modeling & Applications 추계적 모델링 및 응용		⟨Closed⟩
	MGT465(Elective) System Analysis and Design 경영 정보시스템분석 및 설계		⟨Closed⟩
	MGT474(Elective) Social Entrepreneurship 사회적 기업의 창업		⟨Closed⟩
	MGT492(Elective) Capstone Projects I 캡스톤 디자인 I		⟨Closed⟩
	MGT493(Elective) Capstone Projects II 캡스톤 디자인 II		⟨Closed⟩
FIA	FIA302(Elective) Money and Banking 금융시장론	→	⟨Closed⟩
	FIA322(Elective) Intermediate Accounting 2 중급회계 2		⟨Closed⟩
	FIA405(Elective) Corporate Valuation 기업가치평가		⟨Closed⟩
	FIA410(Elective) Special Topics in Finance I 재무특론 I		⟨Closed⟩

Track	2020	→	2021
FIA	FIA411 (Elective) Special Topics in Finance II 재무특론 II	→	⟨Closed⟩
	FIA412(Elective) Special Topics in Accounting I 회계특론 I		⟨Closed⟩
	FIA413(Elective) Special Topics in Accounting II 회계특론 II		⟨Closed⟩
	FIA414(Elective) Applied Investment Management 투자실무		⟨Closed⟩
	FIA415 (Elective) Mergers and Acquisitions 기업인수합병론		⟨Closed⟩
	FIA416(Elective) Corporate Governance 기업 지배구조론		⟨Closed⟩
	FIA442(Elective) Taxation 세무회계		⟨Closed⟩
	FIA445(Elective) Auditing 감사학개론		⟨Closed⟩
	FIA492(Elective) Capstone Projects I 캡스톤 디자인 I		⟨Closed⟩
	FIA493(Elective) Capstone Projects II 캡스톤 디자인 II		⟨Closed⟩
EPS	EPS491(Elective) Capstone Projects I 캡스톤 디자인 I	→	⟨Closed⟩
	EPS492(Elective) Capstone Projects II 캡스톤 디자인 II		⟨Closed⟩

\* Students affiliated in previous MGT, FIA, EPS track can take newly opened course in School of Business Administration and the course can be counted as required or elective(refer to each year curriculum). 기존 MGT, FIA, EPS 트랙 학생들은 경영과학부에서 신규 추가된 교과를 이수할 경우 개설 학년도의 이수구분으로 인정받을 수 있음

## 5. Curriculum Map [교육과정 이수 체계도]

Sophomore 1 <sup>st</sup> Semester	Sophomore 2 <sup>nd</sup> Semester	Junior 1 <sup>st</sup> Semester	Junior 2 <sup>nd</sup> Semester	Senior 1 <sup>st</sup> Semester	Senior 2 <sup>nd</sup> Semester
경영통계분석 (Data Analysis & Decision Making)	경영정보론 (Management Information Systems)	비즈니스데이터사이언스 (Business Data Science)	비즈니스AI (Business AI)		
조직행동론 (Organizational Behavior)		혁신과 변화의 관리 (Managing Innovation and Change)	인사관리 (Human Resource Management)	경영전략 (Strategic Management)	경영과학특론1 (Special Topics in MGT I )
비즈니스커뮤니케이션&리더십 (Business Communication & Leadership)					
마케팅관리 (Marketing Management)		마케팅조사론 (Marketing Research)	국제마케팅 (International Marketing)		
생산운영관리 (Operations Management)	계량경영학 (Operations Research)				
	미시경제학 (Microeconomics)	거시경제학 (Macroeconomics)	국제경제학 (International Economics)	계량경제학 (Econometrics)	
재무회계 (Financial Accounting)	재무제표분석 (Financial Statement Analysis)				
재무관리 (Financial Management)		선물과 옵션 (Futures and Option)	금융공학개론 (Introduction to Financial Engineering)	증권시장론 (Financial Markets and Trading)	금융시계열 분석 (Financial Time-series Analysis)
	투자론 (Investments)	계량재무론 (Quantitative Finance)	금융빅데이터분석 (Data Science for finance)	채권투자 (Fixed Income Securities)	리스크 관리 (Risk Management)
		기업재무론 (Corporate Finance)			

## 2021 Undergraduate Course Catalog

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