Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For undergraduate students admitted in 2015 or before)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 130 Credits**

▣ **Major : At least 41 credits**

○ **Mandatory Major Courses : 21 credits**

CBE201 Molecular Engineering Laboratory (3)
CBE202 Introduction to Chemical and Biomolecular Engineering (3)
CBE203 Industrial Organic Chemistry (3)
CBE205 Chemical and Biomolecular Engineering Analysis (3)
CBE221 Molecular Thermodynamics and Energy Systems (3)
CBE301 Chemical and Biomolecular Engineering Laboratory (3)
CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3)

○ **Elective Major Courses : At least 20 credits**

※ Of the elective major courses offered by the College of Engineering (CoE Code), only one course is considered an elective major course.

▣ **Minor : At least 18 credits**

○ Minor : At least 18 credits
(Mandatory Major Course: 9 credits including CBE202, and one from CBE201 and CBE301, Elective Major Course: 9 credits at least) (applicable to students admitted in 2011 and after)

○ Students admitted in and before 2010 should take 3 credits from mandatory major course (including one from CBE201 and CBE301) and at least 15 credits from elective major course.

※ In the event that major courses and double-major courses overlap, up to 9 **c**redits can be applied to both courses of study.

▣ **Double Major : At least 41 credits (same requirement for major student)**

○ At least 41 credits from major credits including 21 credits from mandatory major courses.

※ In the event that major courses and double-major courses overlap, up to 9 credits can be applied to both courses of study.

▣ **Research Courses : At least 4 credits**

○ Graduation Research : 3 Credits (Mandatory)
○ Department Seminar : 1 Credits (Mandatory)
○ Individual Study : 4 Credits at most

※ Students having a double major are exempt.

☐ Transitional Measures

○ Students admitted in 2015 or before may choose to be governed by the completion requirements applicable to students admitted in 2016 and after if desired.

○ These requirements apply to those who are admitted in and after 2014.

○ Students admitted in and before 2013 may follow the graduation requirement of the year of their admission, or choose the current requirement.

○ In the present completion requirement, the consideration of elective major courses offered by the College of Engineering (CoE Code) as an elective major course is applied to all enrolled students.

○ CBE442 Chemical and Biomolecular Engineering Capstone Design Project is applied as an elective major course for students admitted in 2020 or later. Students admitted between 2014 and 2019 may choose to follow the requirements in their year of admission or the modified requirements(major course requirements for 2020 or later). The same requirements apply for course retaking.

- Double Major/Minor can be subject to requirements for the admission year, requirements at the time of application, or current requirements.

<Major Course Requirements by Admission Year>

Admission Year	Major Course Requirements	
2020 ~	42 Major Course Credits	○ Mandatory Major : 18 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) ○ Elective Major : At least 24 credits
2016~2019	42 Major Course Credits	○ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ○ Elective Major : At least 21 credits
2014~2015	41 Major Course Credits	○ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ○ Elective Major : At least 20 credits
2011~2013	41 Major Course Credits	○ Mandatory Major : 18 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) ○ Elective Major : At least 23 credits
2006~2010	41 Major Course Credits	○ Mandatory Major : 6 credits CBE201 Molecular Engineering Laboratory (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) ○ Elective Major : At least 35 credits

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For undergraduate students admitted in 2016 and after)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 136 credits**

※ Required to choose and complete one among Advanced Major, Double Major, Minor, and Individually Designed Major.

▣ **Major : At least 42 credits**

○ Mandatory Major Courses : 21 credits

○ Elective Major Courses : At least 21 credits

※ Of the elective major courses offered by the College of Engineering (CoE Code), only one course is considered an elective major course.

▣ **Advanced Major : At least 12 credits**

○ At least 12 credits including

CBE206 Introduction to Numerical Methods for Chemical and Biomolecular Engineers
CBE261 Biochemical Engineering
CBE311 Molecular Reaction Engineering
CBE331 Fluid Mechanics for Chemical Engineering
CBE332 Heat and Molecular Transfer
CBE351 Introduction to Macromolecular Engineering

▣ **Individually Designed Major : At least 12 credits**

○ Required to more than 12 credits in major courses offered by more than two academic organizations.

▣ **Minor : At least 18 credits**

○ Minor: At least 18 credits

(Mandatory Major Course: 9 credits including CBE202, and one from CBE201 and CBE301, Elective Major Course: 9 credits at least) (applicable to students admitted in 2011 and after)

※ Recognition of overlapping credits earned in major courses offered by other academic organizations is not allowed.

▣ **Double Major : At least 42 credits**

○ At least 42 credits from major credits including 21 credits from mandatory major courses.

※ In the event that major courses and double-major courses overlap, up to 6 credits can be applied to both courses of study.

▣ **Research Courses : At least 4 credits**

◯ Graduation Research : 3 Credits (Mandatory)

◯ Department Seminar : 1 Credits (Mandatory)

◯ Individual Study : 4 Credits at most

※ Students having double major are exempt.

☐ **Transitional Measures**

◯ Students admitted in 2015 or before may choose to be governed by the completion requirements listed above if desired.

◯ In the present completion requirement, the consideration of elective major courses offered by the College of Engineering (CoE Code) as an elective major course is applied to all enrolled students.

◯ CBE442 Chemical and Biomolecular Engineering Capstone Design Project is applied as an elective major course for students admitted in 2020 or later. Students admitted between 2014 and 2019 may choose to follow the requirements in their year of admission or the modified requirements(major course requirements for 2020 or later). The same requirements apply for course retaking.

- Double Major/Minor can be subject to requirements for the admission year, requirements at the time of application, or current requirements.

<Major Course Requirements by Admission Year>

Admission Year	Major Course Requirements	
2020 ~	42 Major Course Credits	○ Mandatory Major : 18 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) ○ Elective Major : At least 24 credits
2016~2019	42 Major Course Credits	○ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ○ Elective Major : At least 21 credits
2014~2015	41 Major Course Credits	○ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ○ Elective Major : At least 20 credits

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For undergraduate students admitted in 2020 and after)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 136 credits**

※ Required to choose and complete one among Advanced Major, Double Major, Minor, and Individually Designed Major.

▣ **Major : At least 42 credits**

○ Mandatory Major Courses : 18 credits

○ Elective Major Courses : At least 24 credits

※ Of the elective major courses offered by the College of Engineering (CoE Code), only one course is considered an elective major course.

▣ **Advanced Major : At least 12 credits**

○ At least 12 credits including

CBE206 Introduction to Numerical Methods for Chemical and Biomolecular Engineers
CBE261 Biochemical Engineering
CBE311 Molecular Reaction Engineering
CBE331 Fluid Mechanics for Chemical Engineering
CBE332 Heat and Molecular Transfer
CBE351 Introduction to Macromolecular Engineering

▣ **Individually Designed Major : At least 12 credits**

○ Required to more than 12 credits in major courses offered by more than two academic organizations.

▣ **Minor : At least 18 credits**

○ Minor: At least 18 credits

(Mandatory Major Course: 9 credits including CBE202, and one from CBE201 and CBE301, Elective Major Course: 9 credits at least) (applicable to students admitted in 2011 and after)

※ Recognition of overlapping credits earned in major courses offered by other academic organizations is not allowed.

▣ **Double Major : At least 42 credits**

○ At least 42 credits from major credits including 18 credits from mandatory major courses.

※ In the event that major courses and double-major courses overlap, up to 6 credits can be applied to both courses of study.

▣ Research Courses : At least 4 credits

◯ Graduation Research : 3 Credits (Mandatory)

◯ Department Seminar : 1 Credits (Mandatory)

◯ Individual Study : 4 Credits at most

※ Students having double major are exempt.

☐ Transitional Measures

◯ These course requirements shall apply to students admitted in 2020 or later.

◯ In the present completion requirement, the consideration of elective major courses offered by the College of Engineering (CoE Code) as an elective major course is applied to all enrolled students.

◯ CBE442 Chemical and Biomolecular Engineering Capstone Design Project is applied as an elective major course for students admitted in 2020 or later. Students admitted between 2014 and 2019 may choose to follow the requirements in their year of admission or the modified requirements(major course requirements for 2020 or later). The same requirements apply for course retaking.

- Double Major/Minor can be subject to requirements for the admission year, requirements at the time of application, or current requirements.

<Major Course Requirements by Admission Year>

Admission Year	Major Course Requirements	
2020 ~	42 Major Course Credits	◯ Mandatory Major : 18 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) ◯ Elective Major : At least 24 credits
2016~2019	42 Major Course Credits	◯ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ◯ Elective Major : At least 21 credits
2014~2015	41 Major Course Credits	◯ Mandatory Major : 21 credits CBE201 Molecular Engineering Laboratory (3) CBE202 Introduction to Chemical and Biomolecular Engineering (3) CBE203 Industrial Organic Chemistry (3) CBE205 Chemical and Biomolecular Engineering Analysis (3) CBE221 Molecular Thermodynamics and Energy Systems (3) CBE301 Chemical and Biomolecular Engineering Laboratory (3) CBE442 Chemical and Biomolecular Engineering Capstone Design Project (3) ◯ Elective Major : At least 20 credits

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For undergraduate students admitted in 2023 and after)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 138 credits**

※ Required to choose and complete one among Advanced Major, Minor, Double Major, Individually Designed Major, Designated Interdisciplinary Major, and Special Designated Major.

▣ **Major : At least 42 credits**

○ Mandatory Major Courses : 18 credits

○ Elective Major Courses : At least 24 credits

※ Of the elective major courses offered by the College of Engineering (CoE Code), only one course is considered an elective major course.

▣ **Advanced Major : At least 12 credits**

○ At least 12 credits including

CBE206 Introduction to Numerical Methods for Chemical and Biomolecular Engineers
CBE261 Biochemical Engineering
CBE311 Molecular Reaction Engineering
CBE331 Fluid Mechanics for Chemical Engineering
CBE332 Heat and Molecular Transfer
CBE351 Introduction to Macromolecular Engineering

▣ **Individually Designed Major : At least 12 credits**

○ Required to more than 12 credits in major courses offered by more than two academic organizations.

▣ **Minor : At least 18 credits**

○ Minor : At least 18 credits

(Mandatory Major Course: 9 credits including CBE202, and one from CBE201 and CBE301, Elective Major Course: 9 credits at least) (applicable to students admitted in 2011 and after)

※ Recognition of overlapping credits earned in major courses offered by other academic organizations is not allowed.

▣ **Double Major : At least 42 credits**

○ At least 42 credits from major credits including 18 credits from mandatory major courses.

※ In the event that major courses and double-major courses overlap, up to 6 credits can be applied to both courses of study.

▣ **Research Courses : At least 4 credits**

◯ Graduation Research : 3 Credits (Mandatory)

◯ Department Seminar : 1 Credits (Mandatory)

◯ Individual Study : 4 Credits at most

※ Students having double major are exempt.

☐ **Transitional Measures**

◯ These course requirements shall apply to students admitted in 2023 or later.

◯ In the present completion requirement, the consideration of elective major courses offered by the College of Engineering (CoE Code) as an elective major course is applied to all enrolled students.

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For Master's Program)

Thesis Master's Degree Program

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 33 credits.**

▣ **Mandatory General Courses : 3 credits**

▣ **Mandatory Major Courses : 6 credits**

▣ **Elective Courses : At least 12 credits**

◯ It is required, at least, to take 9 credits from lectures offered by the CBE Department.

※ Lectures offered in Graduate School of EEWS by professors of CBE department are considered as lectures offered by CBE department.

※ Other Elective Courses are not acknowledged as Elective Courses.

▣ **Research Courses : At least 12 credits**

◯ At least 12 credits including 2 credits from Seminar

Coursework Master's Degree Program

None

☐ **Transitional Measures**

◯ These requirements apply to those who enrolled in 2013 and onward.

◯ For those who enrolled in 2012 or before should comply to the former requirements:

- Master's Program students who enrolled in 2012: 3 credits of Mandatory Major Course (CBE601); at least 15 credits of Elective Course (12 credits from CBE course)
- Master's Program students who enrolled between 2009 and 2011: at least 18 credits of Elective Course (15 credits from CBE course); no Mandatory Major Course required

◯ The exemption of the completion requirement of taking Master's Seminars is applied to students enrolled in 2022 or before.

- International students who have completed at least one of the Korean language courses are exempted from the completion requirement of taking 2 credits from Seminars.
- Students of the Department of Chemical and Biomolecular Engineering who are taking the Interdisciplinary Program are exempted from the completion requirement of taking 2 credits from Seminars, if they have taken the Interdisciplinary Internship Program.

◯ Other Elective Courses are acknowledged as Elective Courses if completed in 2022 or earlier, and this shall apply to all enrolled students as of spring 2023.

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For Doctoral Program)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 60 credits**

▣ **Mandatory General Courses : 3 credits**

▣ **Mandatory Major Courses : 6 credits**

▣ **Elective Courses : At least 21 credits**

◯ It is required, at least, to take 12 credits from lectures offered by the CBE department.

※ Lectures offered in Graduate School of EEWS by professors of CBE department are considered as lectures offered by CBE department.

※ Other Elective Courses are not acknowledged as Elective Courses.

▣ **Research Courses : at least 30 credits**

※ The course credits earned in the Master's course work can be used towards the Doctoral degree (except research credits).

☐ **Transitional Measures**

◯ These requirements apply to those who enrolled in 2013 and onward.

◯ For those who enrolled in 2012 or before should comply to the former requirements:

- Doctoral, Integrated Master's and Doctoral Degree Program students who enrolled between 2009 and 2012: at least 27 credits of Elective Course (18 credits from CBE course); no Mandatory Major Course required.

◯ Other Elective Courses are acknowledged as Elective Courses if completed in 2022 or earlier, and this shall apply to all enrolled students as of spring 2023.

Major Course Requirement for Dept. of Chemical and Biomolecular Engineering

(For MS-PhD Integrated Program)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation : Required to complete a total of more than 60 credits**

▣ **Mandatory General Courses : 3 credits**

▣ **Mandatory Major Courses : 6 credits**

▣ **Elective Courses : At least 21 credits**

○ It is required, at least, to take 12 credits from lectures offered by the CBE department.

※ Lectures offered in Graduate School of EEWS by professors of CBE department are considered as lectures offered by CBE department.

※ Other Elective Courses are not acknowledged as Elective Courses.

▣ **Research Courses : At least 30 credits**

☐ **Transitional Measures**

○ These requirements apply to those who enrolled in 2013 and onward.

○ For those who enrolled in 2012 or before should comply to the former requirements:

- Doctoral, Integrated Master's and Doctoral Degree Program students who enrolled between 2009 and 2012: at least 27 credits of Elective Course (18 credits from CBE course); no Mandatory Major Course required.

○ Other Elective Courses are acknowledged as Elective Courses if completed in 2022 or earlier, and this shall apply to all enrolled students as of spring 2023.

Substitute Course List

Substitute Courses Offered by Other Departments					
Category	Courses Offered by the Department		Courses Offered by Other Departments		
	Course No.	Course Title	Course No.	Course Title	Remark
Undergraduate	CBE203	Industrial Organic Chemistry	CH221	Organic Chemistry Ⅰ	Unidirectional substitution
Undergraduate	CBE260	Biomolecular Engineering	BS209	Molecular Biology	Unidirectional substitution
Undergraduate	CBE303	Physical Chemistry for Chemical and Bimolecular Engineers Ⅰ	CH213	Physical Chemistry Ⅱ	Unidirectional substitution
Undergraduate	CBE362	Bioinformatics	BiS438	Bioinformatics	Unidirectional substitution
Undergraduate	CBE404	Physical Chemistry for Chemical and Bimolecular Engineers Ⅱ	CH211	Physical Chemistry Ⅰ	Unidirectional substitution
Graduate	CBE567	Metabolic Engineering	BiS622	Metabolic Engineering	Unidirectional substitution
Graduate	CBE653	Mechanical Properties of Polymers	MAE633	Mechanical Behavior of Polymeric and Composite Materials	Unidirectional substitution
Graduate	CBE712	Surface Phenomena	MS654	Surface Science	Unidirectional substitution
Graduate	CBE861	Special Topics in Biochemical Engineering	BS760	Selected Topics in Environmental Biotechnology	Unidirectional substitution

※ Students cannot take both courses to be substituted and courses to be recognized. For example, students can only take either [CBE203] Industrial Organic Chemistry or [CH221] Organic Chemistry Ⅰ.

※ If you have taken [CH213] Physical Chemistry Ⅱ and [CBE303] Physical Chemistry for Chemical and Bimolecular Engineers Ⅰ, or [CH211] Physical Chemistry Ⅰ and [CBE404] Physical Chemistry for Chemical and Bimolecular Engineers Ⅱ in 2013 or before, credits from both courses can be counted in the graduation credits.

※ Substitute courses may differ according to the effective year of the requirements.