

# Table of Curriculum (Undergraduate)

Classification	Course No.	Course Title	Lecture:Lab.: Credit (Homework)	Semester	year plan	Note
Elective Basic Courses	CBE100	Integrating Chemistry and Biology into Engineering	3:0:3(3)	Fall	25 Fall	
Mandatory Major Courses	CBE201	Molecular Engineering Laboratory	1:6:3(6)	Fall	25 Fall	
	CBE203	Industrial Organic Chemistry	3:0:3(3)	Spring or Fall	25 Spring	
	CBE205	Chemical and Biomolecular Engineering Analysis	3:0:3(3)	Spring	25 Spring	☐MAS101, MAS102
	CBE301	Chemical and Biomolecular Engineering Laboratory	1:6:3(6)	Spring	25 Spring	
	CBE311	Reaction Engineering	3:0:3(3)	Spring	25 Spring	
	CBE322	Chemical and Biomolecular Engineering Thermodynamics	3:0:3(3)	Fall	25 Fall	
Elective Major Courses	CBE207	My CBE-Career Planning in Chemical and Biomolecular Engineering	1:0:1	Spring	25 Spring	
	CBE208	Physical Chemistry for Chemical and Biomolecular Engineers I	3:0:3	Fall	25,26 Fall	
	CBE260	Biomolecular Engineering	3:0:3(3)	Spring	25,26 Spring	
	CBE321	Separation Processes	3:0:3(3)	Fall	25 Fall	☐CBE202, CBE322
	CBE341	Process Simulation and Control	3:1:3(3)	Spring	25,26 Spring	
	CBE362	Bioinformatics	3:0:3(3)	Fall	25 Spring	
	CBE363	Introduction to Metabolic Engineering and Synthetic Biology	3:0:3	Spring or Fall	25,26 X	
	CBE371	Electrochemical Principles for Chemical and Biomolecular Engineering	3:0:3	Spring	25,26 Spring	
	CBE404	Physical Chemistry for Chemical and Biomolecular Engineers II	3:0:3(3)	Spring or Fall	25 Fall	◎
	CBE441	Techniques of Process and Product Design	3:0:3(3)	Spring	25,26 Spring	◎ ☐CBE202, CBE321, CBE322
	CBE442	Chemical and Biomolecular Engineering Capstone Design Project	3:0:3(3)	Fall	25 Fall	◎ ☐CBE311, CBE321, CBE441
	CBE444	Introduction to Molecular Modeling and Simulations	3:0:3	Spring or Fall	25 Spring	◎ ☐CBE206
	CBE452	Polymer Synthesis for Chemical and Biomolecular Engineers	3:0:3	Spring or Fall	25 Fall	◎
	CBE455	Nanochemical Technology	3:0:3(3)	Spring or Fall	25 Fall	◎
	CBE461	Biorefineries for Fuels and Chemicals	3:0:3(3)	Spring or Fall	-	◎
	CBE462	Bioseparation Engineering	3:0:3	Spring or Fall	25 Fall	◎
	CBE463	Engineering Principles in Biological Systems	3:0:3	Spring or Fall	25 Fall	◎
	CBE464	Big Data Analysis and Machine Learning for Biotechnology	3:0:3	Spring or Fall	25 Spring	◎ ☐CBE260, CBE261
	CBE472	Introduction to New and Renewable Energy	3:0:3	Spring	25 Spring	◎
	CBE473	Microelectronics Processes	3:0:3(3)	Spring or Fall	25, 26 Spring	◎
	CBE474	Instrumental Analysis for Chemical and Biomolecular Engineering	3:0:3	Spring or Fall	25, 26 Fall	◎
	CBE475	Introduction to Environmental Chemical Engineering	3:0:3	Spring		◎
	CBE481	Special Topics in Chemical and Biomolecular Engineering	3:0:3(3)	Spring or Fall		◎ Subtitle is assigned
	CBE491	Special Topics in Chemical and Biomolecular Engineering II	2:0:2(2)	Spring or Fall		◎ Subtitle is assigned
	CBE492	Special Topics in Chemical and Biomolecular Engineering III	1:0:1(1)	Spring or Fall		◎ Subtitle is assigned
Advanced Major	CBE202	Basic Principles for Chemical and Biomolecular Engineering	3:0:3(3)	Spring	25 Spring	
	CBE206	Introduction to Numerical Methods for Chemical and Biomolecular Engineers	3:0:3	Fall	25 Fall	☐MAS101, MAS102
	CBE261	Biochemical Engineering	3:0:3(3)	Fall	25 Fall	
	CBE331	Fluid Mechanics for Chemical and Biomolecular Engineering	3:0:3(3)	Spring	25 Spring	☐CBE205
	CBE332	Heat and Molecular Transfer	3:0:3(3)	Spring	25 Fall	
	CBE351	Introduction to Macromolecular Engineering	3:0:3(3)	Spring or Fall	25 Spring	
Research	CBE490	Undergraduate Research	0:6:3	Spring or Fall		
	CBE495	Individual Study	0:6:1	Spring or Fall		
	CBE496	Seminar for Undergraduate Students	1:0:1	Spring or Fall		

# Table of Curriculum (Graduate)

Classification	Course No.	Course Title	Lecture:Lab.: Credit (Homework)	Semester	Note
Mandatory Major Courses	CBE601	Research Methodology for Chemical and Biomolecular Engineers	2:3:3(3)	Spring	
	CBE602	Problem Solving in Chemical and Biomolecular Engineering	3:0:3	Spring or Fall	
Elective Courses	CBE502	Engineering Applied Mathematics	3:0:3(4)	Fall	⊙
	CBE503	Numerical Methods for Chemical Engineers	3:0:3(4)	Spring	⊙
	CBE505	Chemical Process and Product Design	3:0:3	Fall	⊙
	CBE511	Design of Reaction Systems	3:0:3(3)	Spring or Fall	⊙
	CBE512	Introduction to Catalysis Engineering	3:0:3(4)	Spring or Fall	⊙
	CBE513	Catalysis for Renewables	3:0:3	Spring	⊙
	CBE520	Reinforcement Learning for Process Industry	3:0:3	Spring	⊙
	CBE522	Introduction to Interfacial Engineering	3:0:3(3)	Spring	⊙
	CBE523	Rate-controlled Separation Processes	3:0:3(4)	Spring	⊙
	CBE525	Molecular Electronics	3:0:3(3)	Spring or Fall	⊙
	CBE531	Multiphase Reactor Engineering	3:0:3(3)	Spring	⊙
	CBE532	Mass Transfer	3:0:3(4)	Spring	⊙
	CBE533	Fundamentals of Microstructured Fluid Flow	3:0:3(4)	Spring or Fall	⊙
	CBE541	Advanced Process Control I	3:0:3(4)	Spring	⊙
	CBE542	Process Optimization	3:0:3(4)	Spring	⊙
	CBE543	Process Systems Engineering Theories and Methods	3:0:3	Fall	⊙ □CBE341
	CBE544	Machine Learning Analysis for Molecules and Materials	3:0:3	Spring or Fall	⊙
	CBE551	Polymer Rheology	3:0:3(3)	Spring or Fall	⊙
	CBE552	Materials Engineering of Polymers	3:0:3(3)	Spring or Fall	⊙
	CBE554	Physical Principles of Polymers	3:0:3(3)	Fall	⊙
	CBE556	Structure and Properties of Macromolecules	3:0:3(3)	Spring	⊙
	CBE562	Drug Design, Development and Delivery	3:0:3	Fall	⊙
	CBE563	Protein Engineering	3:0:3(3)	Spring or Fall	⊙
	CBE564	Bioprocess Engineering	3:0:3(3)	Fall	⊙ □CBE261, CBE311
	CBE567	Metabolic Engineering	3:0:3(4)	Fall	⊙
	CBE568	Nanobiotechnology for Biochemical Engineers	3:0:3(3)	Spring or Fall	⊙
	CBE569	Nucleic Acid Engineering	3:0:3(3)	Spring or Fall	⊙
	CBE571	Energy Engineering	3:0:3(4)	Fall	⊙
	CBE572	Inorganic Materials Processing	3:0:3(4)	Spring or Fall	⊙
	CBE573	Fuel Cell Processes and Materials	3:0:3(3)	Fall	⊙
	CBE581	Micro-chemical and Biomolecular Systems	3:0:3(3)	Spring	⊙ □CBE260
	CBE591	Special Lectures in Chemical and Biomolecular Engineering	3:0:3	Spring or Fall	⊙ Subtitle is assigned
	CBE611	Theory of Catalysis	3:0:3(3)	Spring or Fall	
	CBE612	Design of Catalysis	3:0:3(4)	Spring or Fall	□CBE203
	CBE613	Photocatalytic Reaction Engineering	3:0:3	Fall	
	CBE621	Phase Equilibria and Physical Properties	3:0:3(4)	Spring or Fall	
	CBE622	Mixing Technology in Chemical Engineering	3:0:3(3)	Spring or Fall	

Classification	Course No.	Course Title	Lecture:Lab.: Credit (Homework)	Semester	Note
Elective Courses	CBE623	Thin Film Nanotechnology	3:0:3	Fall	
	CBE624	Nanomaterials and Nanotechnology for Energy and Environment	3:0:3	Spring	
	CBE631	Microfluidics	3:0:3(4)	Fall	
	CBE632	Colloids and Surface Chemistry	3:0:3(3)	Fall	
	CBE641	Advanced Process Design	3:0:3(4)	Spring or Fall	
	CBE651	Multicomponent Polymer Materials	3:0:3(1)	Fall	
	CBE652	Polymer Characterization	3:0:3(3)	Fall	□CBE351
	CBE653	Mechanical Properties of Polymers	3:0:3(4)	Spring or Fall	
	CBE654	Synthesis of Functional Nanomaterials	3:0:3	Fall	
	CBE664	Process for Recombinant Microorganisms	3:0:3(3)	Spring or Fall	
	CBE670	Battery Organic Materials	3:0:3(3)	Fall	
	CBE671	Solar Energy Conversion Materials	3:0:3(3)	Fall	
	CBE672	Air Pollution Control	3:0:3(3)	Fall	
	CBE673	Water Pollution Control	3:0:3(3)	Spring	
	CBE680	Membrane Technology	3:0:3(3)	Fall	
	CBE682	Organic Nano-Structured Materials	3:0:3(3)	Fall	
	CBE683	Electroactive Polymeric Materials and Devices	3:0:3	Spring or Fall	□CBE351
	CBE711	Advanced Reaction Engineering	3:0:3(4)	Spring or Fall	
	CBE712	Surface Phenomena	3:0:3(3)	Spring or Fall	
	CBE731	Polymer Fluid Dynamics	3:0:3(3)	Spring or Fall	
	CBE741	Advanced Process Control II	3:0:3(4)	Spring	
	CBE751	Advanced Rheology of Polymer	3:0:3(3)	Spring or Fall	
	CBE761	Bioprocess Analysis and Control	3:0:3(3)	Spring	□CBE564
	CBE771	Advanced Electrochemical Engineering	3:0:3(4)	Spring or Fall	□CBE371
	CBE773	Recent Topics in Chemical & Biomolecular Engineering	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE811	Special Topics in Chemical Reaction Engineering	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE821	Special Topics in Chemical Engineering Thermodynamics	3:0:3(4)	Spring or Fall	Subtitle is assigned
	CBE831	Special Topics in Transport Phenomena	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE832	Special Topics in Separation Processes	3:0:3(4)	Spring or Fall	Subtitle is assigned
	CBE841	Special Topics in Process Engineering	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE851	Special Topics in Polymer Engineering	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE861	Special Topics in Biochemical Engineering	3:0:3(3)	Spring or Fall	Subtitle is assigned
	CBE871	Recent Topics in Chemical & Biomolecular Engineering II	2:0:2(2)	Spring or Fall	Subtitle is assigned
	CBE872	Recent Topics in Chemical & Biomolecular Engineering III	1:0:1(1)	Spring or Fall	Subtitle is assigned
Research	CBE960	Thesis <Master Student>		Spring or Fall	
	CBE966	Seminar <Master Student>	1:0:1	Spring or Fall	
	CBE980	Thesis <Ph.D. Student>		Spring or Fall	
	CBE986	Seminar <Ph.D. Student>	1:0:1	Spring or Fall	
	CBE998	Practicum in Chemical and Biomolecular Engineering I	0:3:1	Summer or Winter	
	CBE999	Practicum in Chemical and Biomolecular Engineering II	0:6:2	Summer or Winter	

©: Course mutually recognized by undergraduate and graduate programs    □: Prerequisite Courses

※ Course classification, course title, and mutual recognition of credits may differ according to the effective year of the requirements.

# Substitute Course List

Substitute courses in the department					
Category	Courses currently offered		Courses not currently offered		
	Course no.	Course title	Course no.	Course title	Remark
Undergraduate	CBE202	Basic Principles for Chemical and Biomolecular Engineering	CBE202	Introduction to Chemical and Biomolecular Engineering	Course title/Course Classification change
Undergraduate	CBE208	Physical Chemistry for Chemical and Biomolecular Engineers I	CBE303	Physical Chemistry for Chemical and Biomolecular Engineers I	Course No. change
Undergraduate	CBE311	Reaction Engineering	CBE311	Molecular Reaction Engineering	Course Title/Course Classification change
Undergraduate	CBE322	Chemical and Biomolecular Engineering Thermodynamics	CBE221	Molecular Thermodynamics and Energy Systems	Course Title/Course No. change
Undergraduate	CBE331	Fluid Mechanics for Chemical and Biomolecular Engineering	CBE331	Fluid Mechanics for Chemical Engineering	Course Title change

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	CBE208	Physical Chemistry for Chemical and Biomolecular Engineers I	CH213	Physical Chemistry II	Unidirectional substitution
Undergraduate	CBE362	Bioinformatics	BiS438	Bioinformatics	Unidirectional substitution
Undergraduate	CBE404	Physical Chemistry for Chemical and Biomolecular Engineers II	CH211	Physical Chemistry I	Unidirectional substitution
Graduate	CBE567	Metabolic Engineering	BiS622	Metabolic Engineering	Unidirectional substitution
Graduate	CBE653	Mechanical Properties of Polymers	ME633	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 [CBE208] Physical Chemistry for Chemical and Biomolecular Engineers I, or [CH211] Physical Chemistry I and [CBE404] Physical Chemistry for Chemical and Biomolecular 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.