

Chemical Engineering (ChE)

Curriculum Outline

Chemical engineering (ChE) is a branch of engineering that deals with the chemical and physical processes used to develop and make products such as pharmaceuticals, artificial organs, semiconductors, oil refineries, solar panels, clean water, and biocompatible polymers. Chemical engineers have made major contributions to modern society. With the additional knowledge of biology, chemical engineers are devising new ways for living organisms to perform molecular transformation, and discovering new schemes for delivery of medicines to specific sites in the body.

The Chemical Engineering Program intends to prepare chemical engineers for life-long achievement through education in the principles of chemical engineering; to encourage development of communication, teamwork, and leadership skills.

The basic foundation in mathematics, chemistry, physics, and engineering is established in the first two years of the curriculum. A core of required chemical engineering courses is followed by a selection of electives. One group of electives will prepare students to be biochemical engineers, and another group to be chemical process and material engineers.

In addition, ChE students can choose one among three special study (Senior Project, Foreign Exchange, and Extended Training).

- **Senior Project** is for students who would like to conduct their projects under the supervision of ChE faculty members.
- **Foreign Exchange** is designed for students who would like to participate in a student exchange program with foreign partner universities.
- **Extended Training** is designed for students who would like to participate in a longer training period (for the entire semester) under a co-operative training program with companies or organizations.

Structure and Components

1. General Basic Courses	30 Credits
1.1 Part I	21 Credits
1.1.1 Social Sciences	6 Credits
1.1.2 Humanities	3 Credits
1.1.3 Science and Mathematics	3 Credits
1.1.4 Languages	9 Credits
1.2 Part II	9 Credits
2. Major Courses	112 Credits
2.1 Basic Courses	37 Credits
2.1.1 Basic Mathematics and Science Courses	21 Credits
2.1.2 Basic Engineering Courses	16 Credits
2.2 Specialized Courses	75 Credits
2.2.1 Compulsory Engineering Courses	60 Credits
2.2.2 Elective Engineering Courses	15 Credits
3. Free Elective Courses	6 Credits
Total	148 Credits

Details of the Curriculum

1. General Basic Courses	30 Credits
1.1 Part I	21 Credits
1.1.1 Social Sciences (2 courses) TU100 TU101	6 Credits
1.1.2 Humanities (1 course) TU102	3 Credits
1.1.3 Science and Mathematics (1 course) TU103	3 Credits
1.1.4 Languages (3 courses) TU104 TU105 TU106	9 Credits
1.2 Part II	9 Credits
GTS133 GTS202 ITS100	
2. Major Courses	112 Credits
2.1 Basic Courses	37 Credits
2.1.1 Basic Mathematics and Science Courses (9 courses) MAS116 MAS117 MAS210 SCS126 SCS138 SCS139 SCS176 SCS183 SCS184	21 Credits
2.1.2 Basic Engineering Courses (7 courses) EES203 EES204 GTS302 MES231 MES300 MES371 CHS302	16 Credits
2.2 Specialized Courses	75 Credits
2.2.1 Compulsory Engineering Courses	60 Credits
2.2.1.1 Principles of Chemical Engineering (8 courses) CHS211 CHS212 CHS213 CHS241 CHS242 CHS316 CHS343 CHS364	24 Credits
2.2.1.2 Applied Chemical Engineering (10 courses) CHS251 CHS261 CHS331 CHS352 CHS353 CHS355 CHS362 CHS363 CHS461 CHS456	24 Credits
2.2.1.3 Plant Design and Management (4 courses) CHS315 CHS317 CHS457 IES341	12 Credits
2.2.2 Elective Engineering Courses	15 Credits
2.2.2.1 Special Study	6 Credits
Students can choose one among three special studies:	
• Senior Project (3 courses) CHS301 CHS484 CHS485	6 Credits
• Foreign Exchange (3 courses) CHS301 CHS486 or CHS487 CHS488	6 Credits
• Extended Training (1 course) CHS489	6 Credits
2.2.2.2 Optional Courses (2 courses)	6 Credits
Students choose two out of seven optional courses CHS327 CHS328 CHS374 CHS375 CHS481 CHS482 CHS483	
2.2.2.3 Technical Elective Course (1 course)	3 Credits
Student must select to study 1 subject (3 credits) from CHSxxx	
3. Free Elective Courses	6 Credits

- Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
1. General basic courses in Science and Mathematics.
 2. General basic TU courses.
 3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement

148 Credits

ChE Curriculum : 148 Credits

First Year

Semester I

MAS116	Mathematics I	3(3-0-6)
SCS126	Chemistry for Engineers	3(3-0-6)
SCS138	Applied Physics I	3(3-0-6)
SCS176	Chemistry Laboratory	1(0-3-0)
SCS183	Physics Laboratory I	1(0-3-0)
TU100	Civic Engagement	3(3-0-6)
TU103	Life and Sustainability	3(3-0-6)
TU104	Critical Thinking, Reading, and Writing	3(3-0-6)
Sub-Total		20(18-6-36)

Semester II

GTS133	Environmental Studies	3(3-0-6)
ITS100	Introduction to Computers and Programming	3(2-3-4)
MAS117	Mathematics II	3(3-0-6)
SCS139	Applied Physics II	3(3-0-6)
SCS184	Physics Laboratory II	1(0-3-0)
TU105	Communication Skills in English	3(3-0-6)
TU106	Creativity and Communication	3(3-0-6)
Sub-Total		19(17-6-34)

Second Year

Semester I

CHS211	Organic Chemistry	3(3-0-6)
CHS212	Physical Chemistry	3(3-0-6)
CHS241	Material and Energy Balance	3(3-0-6)
EES203	Basic Electrical Engineering	3(3-0-6)
EES204	Basic Electrical Engineering Laboratory	1(0-3-0)
GTS202	English Language Structures	3(3-0-6)
MAS210	Mathematics III	3(3-0-6)
MES300	Engineering Drawing	3(2-3-4)
Sub-Total		22(20-6-40)

Semester II

CHS213	Applied Mathematics in Chemical Engineering	3(3-0-6)
CHS242	Thermodynamics I	3(3-0-6)
CHS251	Fluid Dynamics	3(3-0-6)
CHS261	Chemical Engineering Laboratory I	1(0-3-0)
CHS316	Statistics for Chemical Engineering	3(3-0-6)
GTS302	Technical Writing	2(2-1-3)
MES231	Engineering Mechanics	3(3-0-6)
MES371	Material Science for Engineers	3(3-0-6)
Sub-Total		21(20-4-39)

Third Year

Semester I

CHS315	Environmental Chemical Engineering	3(3-0-6)
CHS317	Safety in Chemical Operations	3(3-0-6)
CHS343	Thermodynamics II	3(3-0-6)
CHS352	Heat Transfer	3(3-0-6)
CHS362	Chemical Engineering Laboratory II	1(0-3-0)
TU101	Thailand, ASEAN, and the World	3(3-0-6)
CHSxxx	Optional Course	3(3-0-6)
Sub-Total		19(18-3-36)

Semester II

CHS331	Chemical Reaction Kinetics and Reactor Design	3(3-0-6)
CHS353	Mass Transfer	3(3-0-6)
CHS363	Chemical Engineering Laboratory III	1(0-3-0)
CHS355	Chemical Engineering Process Design	3(3-0-6)
CHS364	Experimental Design and Methods for ChE	3(3-0-6)
CHS302	Seminar	1(0-2-1)
IES341	Engineering Economy	3(3-0-6)
CHSxxx	Optional Course	3(3-0-6)
Sub-Total		20(18-5-37)

Summer

Students can choose one among three special study

1) Senior Project and Foreign Exchange

CHS301	Chemical Engineering Training	1(0-40-0)
Sub-Total		1(0-40-0)

2) Extended Training

XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
Sub-Total		6(x-x-x)

Fourth Year

Semester I

CHS456	Transport Phenomena	3(3-0-6)
CHS457	Chemical Engineering Plant Design	3(3-0-6)
CHS461	Process Dynamics and Control	3(3-0-6)
CHSxxx	CHS Technical Elective	3(3-0-6)
TU102	Social Life Skills	3(3-0-6)
Sub-Total		15(15-0-30)

1) Senior Project

CHS484	Chemical Engineering Project I	1(0-3-0)
Sub-Total		16(15-3-30)

Semester II

1) Senior Project

CHS485	Chemical Engineering Project II	4(0-12-0)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
Sub-Total		10(x-x-x)

2) Foreign Exchange

CHS486	Special Studies in ChE I	3(3-0-6)
or		
CHS487	Special Studies in ChE II	3(3-0-6)
CHS488	Special Studies in ChE III	2(2-0-4)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
Sub-Total		11(x-x-x)

3) Extended Training

CHS489	Extended Chemical Engineering Training	6(0-40-0)
Sub-Total		6(0-40-0)