

# 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 optional tracks (Senior Project Track, Foreign Exchange Track, and Extended Training Track).

- **Senior Project Track** is for students who would like to conduct their projects under the supervision of ChE faculty members.
- **Foreign Exchange Track** is designed for students who would like to participate in a student exchange program with foreign partner universities.
- **Extended Training Track** 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

<b>1. General Basic Courses</b>	<b>30</b>	<b>Credits</b>
1.1 Part I	21	Credits
1.1.1 Humanities	2	Credits
1.1.2 Social Sciences	5	Credits
1.1.3 Languages	9	Credits
1.1.4 Science and Mathematics	5	Credits
1.2 Part II	9	Credits
<b>2. Core Courses</b>	<b>111</b>	<b>Credits</b>
2.1 Compulsory Courses	96	Credits
2.2 Compulsory Elective Courses	12	Credits
2.3 Technical Elective Courses	3	Credits
<b>3. Free Elective Courses</b>	<b>6</b>	<b>Credits</b>
<b>Total</b>	<b>147</b>	<b>Credits</b>

## Details of the Curriculum

<b>1. General Basic Courses</b>	<b>30</b>	<b>Credits</b>
1.1 Part I	21	Credits
1.1.1 Humanities (1 course)	2	Credits
TU110		
1.1.2 Social Sciences (2 courses)	5	Credits
TU100    TU120		
1.1.3 Languages (3 courses)	9	Credits
EL171    EL172    TU140		
1.1.4 Science and Mathematics (2 courses)	5	Credits
ITS100    TU130		
1.2 Part II	9	Credits
GTS132            GTS133            GTS202		
<b>2. Core Courses</b>	<b>111</b>	<b>Credits</b>
2.1 Compulsory Courses	96	Credits
2.1.1 Science and Mathematics (9 Courses)	21	Credits
MAS116    MAS117    MAS210    SCS126		
SCS138    SCS139    SCS176    SCS183		
SCS184		
2.1.2 Non-ChE Courses (7 courses)	18	Credits
ECS203    ECS204    GTS302    IES341		
MES231    MES300    MES371		
2.1.3 ChE Courses (21 courses)	57	Credits
CHS211    CHS212    CHS213    CHS241		
CHS242    CHS251    CHS315    CHS316		
CHS317    CHS331    CHS343    CHS352		
CHS353    CHS355    CHS362    CHS363		
CHS364    CHS402    CHS456    CHS457		
CHS461		
2.2 Compulsory Elective Courses	12	Credits
Part I		
(CHS301 and CHS484) or (CHS301, CHS485 and CHS486) or (CHS487)		
Part II		
<b>2.2.1 Option I : Bio-Chemical Engineering</b>		
(2 courses)		
CHS327    CHS328		
<b>2.2.2 Option II : Chemical Process and Materials</b>		
(2 courses)		
CHS374    CHS375		
2.3 Technical Elective Course (1 course)	3	Credits
Student must select to study 1 subject (3 credits) from CHSxxx		
<b>3. Free Elective Courses</b>	<b>6</b>	<b>Credits</b>
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.		
XXXxxx, XXXxxx		
<b>Total Credit Requirement</b>	<b>147</b>	<b>Credits</b>

# ChE Curriculum : 147 Credits

## Course Credits (lecture-practice-self study hrs)

### First Year

#### Semester I

EL171	English Course II	3(3-0-6)
GTS132	Introduction to Biological Science	3(3-0-6)
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 Education	3(3-0-6)
TU130	Integrated Sciences and Technology	2(2-0-4)
<b>Sub-Total</b>		<b>22(20-6-40)</b>

#### Semester II

EL172	English Course III	3(3-0-6)
GTS133	Environmental Studies	3(2-2-5)
ITS100	Introduction to Computer 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)
TU140	Thai Studies	3(3-0-6)
<b>Sub-Total</b>		<b>19(16-8-33)</b>

### Second Year

#### Semester I

CHS211	Organic Chemistry	3(3-0-6)
CHS241	Material and Energy Balance	3(3-0-6)
CHS316	Statistics for Chemical Engineering	3(3-0-6)
ECS203	Basic Electrical Engineering	3(3-0-6)
GTS202	English Language Structures	3(3-0-6)
MAS210	Mathematics III	3(3-0-6)
MES300	Engineering Drawing	3(2-3-4)
<b>Sub-Total</b>		<b>21(20-3-40)</b>

#### Semester II

CHS212	Physical Chemistry	3(3-0-6)
CHS213	Applied Mathematics in Chemical Engineering	3(3-0-6)
CHS242	Thermodynamics I	3(3-0-6)
CHS251	Fluid Dynamics	3(3-0-6)
ECS204	Basic Electrical Engineering Laboratory	1(0-3-0)
GTS302	Technical Writing	2(2-1-3)
MES231	Engineering Mechanics	3(3-0-6)
MES371	Material Science for Engineers	3(3-0-6)
<b>Sub-Total</b>		<b>21(20-4-39)</b>

### Third Year

#### Semester I

CHS315	Environmental Chemical Engineering	3(3-0-6)
CHS331	Chemical Reaction Kinetics and Reactor Design	3(3-0-6)
CHS343	Thermodynamics II	3(3-0-6)
CHS352	Heat Transfer	3(3-0-6)
CHS362	Chemical Engineering Laboratory I	1(0-3-0)
TU120	Integrated Social Sciences	2(2-0-4)

#### Option I: Bio-Chemical Engineering

CHS32x	Compulsory Elective Course	3(3-0-6)
<b>Sub-Total</b>		<b>18(17-3-34)</b>

#### Option II: Chemical Process and Materials

CHS37x	Compulsory Elective Course	3(3-0-6)
<b>Sub-Total</b>		<b>18(17-3-34)</b>

## Course Credits (lecture-practice-self study hrs)

### Semester II

CHS317	Safety in Chemical Operations	3(3-0-6)
CHS353	Mass Transfer	3(3-0-6)
CHS363	Chemical Engineering Laboratory II	1(0-3-0)
CHS355	Chemical Engineering Process Design	3(3-0-6)
CHS364	Experimental Design and Methods for Chemical Engineering	3(3-0-6)
IES341	Engineering Economy	3(3-0-6)

#### Option I: Bio-Chemical Engineering

CHS32x	Compulsory Elective Course	3(3-0-6)
<b>Sub-Total</b>		<b>19(18-3-36)</b>

#### Option II: Chemical Process and Materials

CHS37x	Compulsory Elective Course	3(3-0-6)
<b>Sub-Total</b>		<b>19(18-3-36)</b>

### Summer

Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

#### 1. Senior Project Track and Foreign Exchange Track

CHS301	Chemical Engineering Training	0(0-0-0)
<b>Sub-Total</b>		<b>0(0-0-0)</b>

#### 2. Extended Training Track

XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>6(x-x-x)</b>

### Fourth Year

#### Semester I

CHS402	Seminar	1(0-2-1)
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)
TU110	Integrated Humanities	2(2-0-4)
<b>Sub-Total</b>		<b>15(14-2-29)</b>

### Semester II

#### 1) Senior Project Track

CHS484	Chemical Engineering Project	6(0-18-0)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>12(x-x-x)</b>

#### 2) Foreign Exchange Track

CHS485	Special Studies in ChE I	3(3-0-6)
CHS486	Special Studies in ChE II	3(3-0-6)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
<b>Sub-Total</b>		<b>12(x-x-x)</b>

#### 3) Extended Training Track

CHS487	Extended Chemical Engineering Training	6(0-40-0)
<b>Sub-Total</b>		<b>6(0-40-0)</b>