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

1. General Basic Courses	**30 Credits**
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
2. Core Courses	**111 Credits**
2.1 Compulsory Courses	96 Credits
2.2 Compulsory Elective Courses	12 Credits
2.3 Technical Elective Courses	3 Credits
3. Free Elective Courses	**6 Credits**
Total	**147 Credits**

Details of the Curriculum

1. General Basic Courses **30 Credits**

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

2. Core Courses **111 Credits**

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

2.2.1 Option I : Bio-Chemical Engineering
(2 courses)
CHS327 CHS328

2.2.2 Option II : Chemical Process and Materials
(2 courses)
CHS374 CHS375

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.
XXXxxx, XXXxxx

Total Credit Requirement **147 Credits**

ChE Curriculum : 147 Credits

Course	*Credits (lecture-practice-self study hours)*

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)
	Sub-Total	**22(20-6-40)**

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)
	Sub-Total	**19(16-8-33)**

Second Year

Semester I

CHS212	Physical 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)
ECS204	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

CHS211	Organic 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)
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	**20(20-1-39)**

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)
	Sub-Total	**18(17-3-34)**
	Option II: Chemical Process and Materials	
CHS37x	Compulsory Elective Course	3(3-0-6)
	Sub-Total	**18(17-3-34)**

Course	*Credits (lecture-practice-self study hours)*

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)
	Sub-Total	**19(18-3-36)**
	Option II: Chemical Process and Materials	
CHS37x	Compulsory Elective Course	3(3-0-6)
	Sub-Total	**19(18-3-36)**

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)
	Sub-Total	**0(0-0-0)**

2. Extended Training Track

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

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)
	Sub-Total	**15(14-2-29)**

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)
	Sub-Total	**12(x-x-x)**

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)
	Sub-Total	**12(x-x-x)**

3) Extended Training Track

CHS487	Extended Chemical Engineering Training	6(0-40-0)
	Sub-Total	**6(0-40-0)**