Chemical Engineering (ChE)

Curriculum Outline

Chemical engineering 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 transformations, 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, and to encourage development of communication, teamwork and leadership skills.

A basic foundation in mathematics, chemistry, physics, and engineering is established in the first two years of the curriculum. A core of required Chemistry and 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 also choose 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 wish to participate in an 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 whole semester) under a co-operative training program with companies or organizations.

Structure and Components

1. General Basic Courses	**30 Credits**
1.1 Humanities	6 Credits
1.2 Social Sciences	3 Credits
1.3 English Language	9 Credits
1.4 Science and Mathematics	12 Credits
2. Core Courses	**111 Credits**
2.1 Compulsory Courses	95 Credits
2.2 Compulsory Elective Courses	13 Credits
2.3 Practical Training	(No) Credit
2.4 Technical Elective Course	3 Credits
3. Free Elective Courses	**6 Credits**
Total	**147 Credits**

Details of the Curriculum

1. General Basic Courses **30 Credits**

1.1 Humanities (2 courses) 6 Credits
TU 110 TU 140

1.2 Social Sciences (1 course) 3 Credits
TU 120

1.3 English Language (3 courses) 9 Credits
EL 171 EL 172 EL 210

1.4 Science and Mathematics (4 courses) 12 Credits
GTS 132 GTS 133 ITS 050 TU 130

2. Core Courses **111 Credits**

2.1 Compulsory Courses (36 courses) 95 Credits

2.1.1 Science and Mathematics 21 Credits
(9 Courses)
MAS 116 MAS 117 MAS 210 SCS 126
SCS 138 SCS 139 SCS 176 SCS 183
SCS 184

2.1.2 Non-ChE Courses (7 courses) 18 Credits
ECS 303 ECS 304 GTS 302 IES 341
MES 300 MES 231 MES 371

2.1.3 ChE Courses (20 courses) 56 Credits
CHS 211 CHS 212 CHS 213 CHS 241
CHS 242 CHS 251 CHS 316 CHS 331
CHS 343 CHS 352 CHS 353 CHS 356
CHS 402 CHS 417 CHS 454 CHS 455
CHS 457 CHS 461 (CHS 301 and CHS 484)
or (CHS 301 and CHS 485 and CHS 486)
or (CHS 487)

2.2 Compulsory Elective Courses 13 Credits

2.2.1 ***Option I: Bio-Chemical Engineering***
(5 courses)
CHS 321 CHS 322 CHS 324 CHS 334
CHS 415

2.2.2 ***Option II: Chemical Process and Materials***
(5 courses)
CHS 358 CHS 371 CHS 372 CHS 373
CHS 459

2.3 Practical Training (No) Credit
CHS 301

2.4 Technical Elective Course (1 course) 3 Credits
Select 3 credits from the list of courses
in ChE curricula at SIIT, except basic courses.
CHSxxx

3. Free Elective Courses **6 Credits**
Select any courses offered by the university,
except basic courses.
XXX xxx

Total Credit Requirement **147 Credits**

ChE Curriculum : 147 Credits

First Year

Semester I		***Credits (lecture-practice-self study hrs)***	
EL	171	English Course II	3(3-1-5)
ITS	050	Intro. to Computers and Programming	3(2-3-4)
MAS	116	Mathematics I	3(3-1-5)
SCS	126	Chemistry for Engineers	3(3-1-5)
SCS	138	Applied Physics I	3(3-1-5)
SCS	176	Chemistry Laboratory	1(0-3-0)
SCS	183	Physics Laboratory I	1(0-3-0)
TU	130	Integrated Sciences and Technology	3(3-0-6)
		Sub-Total	**20(17-13-30)**
Semester II			
EL	172	English Course III	3(3-1-5)
GTS	132	Introduction to Life Science	3(3-1-5)
GTS	133	Environmental Studies	3(2-2-5)
MAS	117	Mathematics II	3(3-1-5)
SCS	139	Applied Physics II	3(3-1-5)
SCS	184	Physics Laboratory II	1(0-3-0)
TU	140	Thai Studies	3(3-0-6)
		Sub-Total	**19(17-9-31)**

Second Year

Semester I		***Credits (lecture-practice-self study hrs)***	
CHS	213	Applied Mathematics in Chemical Engineering	3(3-0-6)
CHS	241	Material and Energy Balance	3(3-0-6)
ECS	303	Basic Electrical Engineering	3(3-1-5)
ECS	304	Basic Electrical Engineering Lab.	1(0-3-0)
EL	210	English for Engineering I	3(3-1-5)
MAS	210	Mathematics III	3(3-1-5)
MES	300	Engineering Drawing	3(2-3-4)
		Sub-Total	**19(17-9-31)**
Semester II			
CHS	211	Organic Chemistry for Engineers	3(3-0-6)
CHS	212	Physical Chemistry for Engineers	3(3-0-6)
CHS	242	Chemical Engineering Thermodynamics I	3(3-0-6)
CHS	251	Unit Operations I	3(3-0-6)
GTS	302	Technical Writing	2(2-1-3)
MES	231	Engineering Mechanics	3(3-1-5)
MES	371	Material Science for Engineers	3(3-1-5)
		Sub-Total	**20(20-3-37)**

Third Year

Semester I			
CHS	316	Statistics for Chemical Engineering	3(3-0-6)
CHS	331	Chemical Reaction Kinetics and Reactor Design	3(3-0-6)
CHS	343	Chemical Engineering Thermodynamics II	3(3-0-6)
CHS	352	Unit Operations II	3(3-0-6)
IES	341	Engineering Economy	3(3-0-6)
		Option I: Bio-Chemical Engineering	
CHS	321	Cell Biology for Chemical Engineers	3(3-0-6)
CHS	322	Cell Biology Laboratory	1(0-3-0)
		Sub-Total	**19(18-3-36)**
		Option II: Chemical Process and Materials	
CHS	371	Petroleum & Petrochemical Technology	3(3-0-6)
		Sub-Total	**18(18-0-36)**
Semester II			
CHS	353	Unit Operations III	3(3-0-6)
CHS	356	Transport Phenomena	3(3-0-6)
CHS	455	Chemical Engineering Process Design	3(3-0-6)
TU	120	Integrated Social Sciences	3(3-0-6)
		Option I: Bio-Chemical Engineering	
CHS	324	Pharmaceutical Industry and Technology	3(3-0-6)
CHS	334	Bioreactor Design and Enzymatic System	3(3-0-6)
		Sub-Total	**18(18-0-36)**
		Option II: Chemical Process and Materials	
CHS	358	Chemical Process Laboratory	1(0-3-0)
CHS	372	Polymer Science and Development	3(3-0-6)
CHS	373	Polymer Processing	3(3-0-6)
		Sub-Total	**19(18-3-36)**
Summer			
CHS	301	Chemical Engineering Training	0(0-0-0)

(Except for students who select to take CHS 487 Extended Chemical Engineering Training)

Fourth Year

Semester I			
CHS	402	Chemical Engineering Seminar	1(0-2-1)
CHS	417	Safety in Chemical Operations	3(3-0-6)
CHS	454	Chemical Engineering Laboratory	1(0-3-0)
CHS	457	Chemical Engineering Plant Design	3(3-0-6)
CHS	461	Process Dynamics and Control	3(3-0-6)
CHS	xxx	CHS Technical Elective	3(3-0-6)
TU	110	Integrated Humanities	3(3-0-6)
		Option I: Bio-Chemical Engineering	
CHS	415	Environmental Chemical Engineering	3(3-0-6)
		Sub-Total	**20(18-5-37)**
		Option II: Chemical Process and Materials	
CHS	459	Industrial Chemical Processes	3(3-0-6)
		Sub-Total	**20(18-5-37)**
Semester II			
*XXX	xxx	Free Elective	3(3-0-6)
*XXX	xxx	Free Elective	3(3-0-6)

and one of the following 3 tracks:

1) Senior Project Track			
CHS484		Senior Project	6(0-18-0)
		Sub-Total	**12(6-18-12)**
2) Foreign Exchange Track			
CHS 485		Special Study in ChE I	3(3-0-6)
CHS 486		Special Study in ChE II	3(3-0-6)
		Sub-Total	**12(12-0-24)**
3) Extended Training Track			
CHS 487		Extended Chemical Engineering Training	6(0-40-0)
		Sub-Total	**12(6-40-12)**

Remark

*Students who plan to take the Extended Chemical Engineering Training are advised to take 6 credits of the Free Elective courses in the summer session of the 3rd year.