

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 the 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.

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 Chemistry and Chemical Engineering courses is followed by a selection of electives. One group of electives will prepare a student to be a biochemical engineer, and another group to be an environmental engineer.

Structure and Components

1. General Basic Courses and Basic Courses in Science and Mathematics	48 Credits
1.1 Humanities	6 Credits
1.2 Social Sciences	3 Credits
1.3 English Language	9 Credits
1.4 Science and Mathematics	30 Credits
2. Core Courses	93 Credits
2.1 Compulsory Courses	77 Credits
2.2 Compulsory Elective Courses	13 Credits
2.3 Technical Elective Courses	3 Credits
3. Free Elective Courses	6 Credits
Total	<u>147</u> Credits

Details of the Curriculum

1. General Basic Courses and Basic Courses in Science and Mathematics	48 Credits
1.1 Humanities (2 courses) TU 110 TU 140	6 Credits
1.2 Social Sciences (1 course) TU 120	3 Credits
1.3 English Language (3 courses) EL 171 EL 172 EL 210	9 Credits
1.4 Science and Mathematics (12 courses) GTS 132 GTS 133 MAS 116 MAS 117 MAS 210 SCS 126 SCS 138 SCS 139 SCS 176 SCS 183 SCS 184 TU 130	30 Credits
2. Core Courses	93 Credits
2.1 Compulsory Courses (25 courses)	77 Credits
2.1.1 Non-ChE Courses (8 courses)	21 Credits
GTS 302 IES 341 ITS 050 MES 300 MES 231 MES 371 ECS 303 ECS 304	
2.1.2 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) <i>or</i> (CHS 301 and CHS 485 and CHS 486) <i>or</i> (CHS 487)	
2.2 Compulsory Elective Courses	13 Credits
2.2.1 Option I: Bio-Chemical Engineering (5 courses)	5 Credits
CHS 321 CHS 322 CHS 324 CHS 334 CHS 415	
2.2.2 Option II: Chemical Process and Materials (5 courses)	5 Credits
CHS 358 CHS 371 CHS 372 CHS 373 CHS 459	
2.3 Technical Elective Courses	3 Credits
Select 3 credits from the list of courses in ChE curriculum at SIIT, except basic courses. CHS xxx	
3. Free Elective Courses	6 Credits
Select any courses offered by the university, except basic courses. XXX xxx	
Total Credit Requirement	<u>147</u> 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	Credits (lecture-practice-self study hrs)
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)

Third Year

Semester I	Credits (lecture-practice-self study hrs)
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	Credits (lecture-practice-self study hrs)
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	Credits (lecture-practice-self study hrs)
CHS 301 Chemical Engineering Training (Except for students who select to take CHS 487)	0(0-0-0)

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	Credits (lecture-practice-self study hrs)
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)

Fourth Year

Semester I	Credits (lecture-practice-self study hrs)
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)

Option II: Chemical Process and Materials	
CHS 459 Industrial Chemical Processes	3(3-0-6)

Sub-Total	20(18-5-37)
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Semester II	Credits (lecture-practice-self study hrs)
*XXX xxx Free Elective	3(3-0-6)
*XXX xxx Free Elective	3(3-0-6)

and	
**CHS 484 Senior Project	6(0-18-0)
Sub-Total	12(6-18-12)

or	
***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)

or	
****CHS 487 Chemical Engineering Extended Training	6(0-40-0)
Sub-Total	12(6-40-12)

Remarks
*If students would like to take the Extended Chemical Engineering Training Track in the second semester of their 4th year, the students are advised to take 6 credits of these Free Elective courses in the summer semester of the 3rd year.

**Senior Project II is for the students who wish to take the Senior Project Track.

***Special Studies in Chemical Engineering I and II are for the students who wish to take the Exchange Track.

**** Extended Chemical Engineering Training is for the students who wish to take the Extended Chemical Engineering Training Track.