

CHEMICAL ENGINEERING, BACHELOR OF SCIENCE

The Chemical Engineering program at Hamad Bin Khalifa University (HBKU) offers a comprehensive approach that blends theoretical foundations with practical applications. This equips students to tackle modern challenges in areas such as chemical processing, environmental and sustainable engineering, and materials science.

With an emphasis on collaborative education, training, research, and capacity-building, the program aims to prepare adaptable engineers, capable of meeting society's evolving needs and embracing leadership, social consciousness, integrity, and ethics.

Requirements

Minimum hours required to complete program 130 CH

Code	Title	Hours
CHEM 127	General Chemistry I	3
CHEM 128	General Chemistry I Laboratory	1
CHEM 130	General Chemistry II	3
CHEM 131	General Chemistry II Laboratory	1
CHEM 227	Organic Chemistry I	3
CHEM 228	Organic Chemistry II	3
CHEM 237	Organic Chemistry I Laboratory	1
CHEM 238	Organic Chemistry II Laboratory	1
CHEM 201	Chemical Engineering Foundation	2
CHEM 204	Elementary Chemical Engineering	3
CHEM 205	Thermodynamic I	3
CHEM 304	Fluid Mechanics	3
CHEM 320	Numerical Methods in Chemical Engineering	3
CHEM 322	Materials Engineering	3
CHEM 323	Heat Transfer	3
CHEM 324	Mass Transfer	3
CHEM 354	Thermodynamics II	3
CHEM 364	Reaction Kinetics and Reactor Design	3
CHEM 368	Physical Chemistry for Chemical Engineering	3
CHEM 381	Seminar	1
CHEM 391	Internship	0
CHEM 425	Process Optimization and Economics	3
CHEM 426	Plant Design	3
CHEM 432	Unit Operation Laboratory I	2
CHEM 433	Unit Operation Laboratory II	2
CHEM 455	Process Safety and Risk Analysis	3
CHEM 461	Process Control	3
CHEM 482	Bioprocess Engineering	3
ENGL 114	Composition and Rhetoric	3
ENGL 220	Technical Writing	3
ENGR 110	Introduction to Programming	3
ENGR 210	Introduction to Innovations and Technology Entrepreneurship	1
ENGR 482	Engineering Ethics	3
MATH 161	Engineering Mathematics I	4
MATH 162	Engineering Mathematics II	4
MATH 261	Engineering Mathematics III	3

MATH 318	Differential Equations	3
PHYS 216	Newtonian Mechanics for Engineering and Science	3
PHYS 217	Electricity and Magnetism for Engineering and Science	3
PHYS 226	Experimental Physics and Engineering Laboratory I: Mechanics	1
PHYS 227	Experimental Physics and Engineering Laboratory II: Electricity and Magnetism	1
Subtotal		103

Technical Area Electives 9

Student must take at Two courses should be selected from one area, and the third course should be selected from a different area.

CHEM 489 Selected Topics in Chemical Engineering

Technical Area 1 - Environmental and Sustainable Engineering

CHEM 452 Air Pollution and Climate Change

CHEM 453 Fundamentals of Environmental Remediation Processes

CHEM 456 Waste Management and Processing

CHEM 457 Environmental Engineering

CHEM 460 Quantitative Risk Analysis in Safety Engineering

CHEM 462 Machine Learning for Engineers

CHEM 466 Chemical Process Industry

Technical Area 2 - Materials and Energy Engineering

CHEM 451 Renewable Energy

CHEM 458 Water and Wastewater Treatment Processes

CHEM 459 Gas and Petroleum Processing

CHEM 464 Pharmaceutical and Food Engineering

CHEM 470 Applied Catalysis

CHEM 472 Materials Synthesis, Characterization, and Testing

CHEM 474 Nanotechnology and Nanomaterials

CHEM 476 Polymer Science and Engineering

CHEM 478 Solid State Physics

University Core Curriculum Areas 18

Student must take required credits from each area

Area 1: Identity and Communication (6 Credits)

ARAB 150 Arabic for Professional Communication

ISLM 105 Scriptural Ethics

COMM 110 Language, Identity, and Communication in Qatar

COMM 115 Language and Islamic Identities

Area 4: Social and Behavioral Sciences (3 Credits)

PSYC 101 Introduction to Psychology

HELT 115 Health and Wellness in Modern Society

SOCI 101 Introduction to Sociology

ECON 110 Economic Principles

POLS 135 International Relations of the Gulf

POLS 136 Perspectives in Gulf Studies

SOCI 105 AI and Society

POLS 140 Global Grand Challenges

POLS 137 Policy Analysis, Design and Implementation

SOCI 115 Comparative Theories and Methods

LAW 103 Law and Technology

Area 5A: Humanities (3 credits)

ARAB 152 Arabic Linguistics

HIST 107	World History
HUMN 111	Data Methods for Digital Humanities
ISLM 106	Philosophy, Theology, and Ethics
FIN 101	Ethical Finance
HUMN 116	Beyond Oil, Gucci, and Karak
<i>Area 5B: Creative Expression (3 Credits)</i>	
HUMN 113	Art and Visual Culture
HUMN 114	Cinema and Musical Culture in the Arab World
HUMN 105	Global Cinema
ENGL 115	Creative and Digital Writing
HUMN 110	Moral Reasoning and Decision-Making
ISLM 117	Islamic Art and Architecture
LITR 110	World Literature and the Modern World
<i>Area 6: Leadership and Civic Engagement (3 Credits)</i>	
SOCI 111	Community Service and Engagement
SOCI 117	Technology, Innovation, and Society
SOCI 137	Global Citizenship and Social Responsibility

Total Hours **130**

Freshman

First Semester	Hours
CHEM 127 General Chemistry I	3
CHEM 128 General Chemistry I Laboratory	1
MATH 161 Engineering Mathematics I	4
ENGR 110 Introduction to Programming	3
ENGL 114 Composition and Rhetoric	3
UCC Univ. Core Elective	3
Semester Hours	17

Second Semester	
CHEM 130 General Chemistry II	3
CHEM 131 General Chemistry II Laboratory	1
PHYS 216 Newtonian Mechanics for Engineering and Science	3
PHYS 226 Experimental Physics and Engineering Laboratory I: Mechanics	1
MATH 162 Engineering Mathematics II	4
UCC Univ. Core Elective	3
Semester Hours	15

Sophomore

First Semester	Hours
CHEM 227 Organic Chemistry I	3
CHEM 237 Organic Chemistry I Laboratory	1
CHEN 201 Chemical Engineering Foundation	2
CHEN 204 Elementary Chemical Engineering	3
ENGR 210 Introduction to Innovations and Technology Entrepreneurship	1
PHYS 217 Electricity and Magnetism for Engineering and Science	3
PHYS 227 Experimental Physics and Engineering Laboratory II: Electricity and Magnetism	1
MATH 261 Engineering Mathematics III	3
Semester Hours	17

Second Semester	
CHEM 228 Organic Chemistry II	3
CHEM 238 Organic Chemistry II Laboratory	1
CHEN 205 Thermodynamic I	3
ENGL 220 Technical Writing	3
MATH 318 Differential Equations	3
UCC Univ. Core Elective	3
Semester Hours	16

Junior

First Semester	Hours
ENGR 482 Engineering Ethics	3
CHEN 304 Fluid Mechanics	3
CHEN 354 Thermodynamics II	3
CHEN 320 Numerical Methods in Chemical Engineering	3
CHEN 322 Materials Engineering	3
CHEN 381 Seminar	1
Semester Hours	16

Second Semester	
CHEN 364 Reaction Kinetics and Reactor Design	3
CHEN 368 Physical Chemistry for Chemical Engineering	3
CHEN 323 Heat Transfer	3
CHEN 324 Mass Transfer	3
UCC Univ. Core Elective	3
Semester Hours	15

Third Semester	
CHEN 391 Internship	0
Semester Hours	0

Senior

First Semester	Hours
CHEN 425 Process Optimization and Economics	3
CHEN 432 Unit Operation Laboratory I	2
CHEN 455 Process Safety and Risk Analysis	3
CHEN 461 Process Control	3
Technical Area Elective	3
UCC: Univ. Core Elective	3
Semester Hours	17

Second Semester	
CHEN 426 Plant Design	3
CHEN 433 Unit Operation Laboratory II	2
CHEN 482 Bioprocess Engineering	3
Technical Area Elective	3
Technical Area Elective	3
UCC: Univ. Core Elective	3
Semester Hours	17

Total Hours **130**