

# 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 129 CH

Code	Title	Hours
CHEM 127	General Chemistry I	4
CHEM 130	General Chemistry II	4
CHEM 227	Organic Chemistry I	3
CHEM 228	Organic Chemistry II	3
CHEM 237	Organic Chemistry I - Lab	1
CHEM 238	Organic Chemistry II - Lab	1
CHEM 201	Chemical Engineering Foundation	2
CHEM 204	Elementary Chemical Engineering	3
CHEM 205	Thermodynamics 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 Engineers	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 Lab I	2
CHEM 433	Unit Operation Lab 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 482	Ethics and Engineering	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 & Engineering Lab I: Mechanics	2
PHYS 227	Experimental Physics & Engineering Lab II: Electricity and Magnetism	2
Subtotal		104
<i>Technical Area Electives</i>		9
CHEM 451	Renewable Energy	
CHEM 452	Air Pollution and Climate Change	
CHEM 453	Fundamentals of Environmental Remediation Processes	
CHEM 456	Waste Management Processing	
CHEM 457	Environmental Engineering	
CHEM 458	Water and Wastewater Treatment Processes	
CHEM 459	Gas and Petroleum Processing	
CHEM 460	Quantitative Risk Analysis in Safety Engineering	
CHEM 462	Machine Learning for Engineers	
CHEM 464	Pharmaceutical and Food Engineering	
CHEM 466	Chemical Process Industry	
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	
CHEM 489	Selected Topics in Chemical Engineering	
UCC Electives		18
ARAB 150	Arabic for Professional Communication	
ARAB 152	Arabic Linguistics	
BIOL 101	Biology	
COMM 110	Intercultural Communication in a Global Context	
ECON 110	Economic Principles	
ENGL 115	Creative and Digital Writing	
ENGR 125	AI Literacy & Critical Thinking	
ENGR 130	Sustainable Cities and Urban Mobility	
HELT 115	Health and Wellness in Modern Society	
HIST 107	World History	
HUMN 105	Global Cinema	
HUMN 110	Moral Reasoning and Decision-Making	
HUMN 111	Data Methods for Digital Humanities	
HUMN 113	Art and Visual Culture	
HUMN 114	Cinema and Musical Culture in the Arab World	
ISLM 105	Scriptural Ethics	
ISLM 106	Philosophy, Theology, and Ethics	
ISLM 117	Islamic Art and Architecture	
LAW 103	Law and Technology	
POLS 135	International Relations of the Gulf	
POLS 136	Perspectives in Gulf Studies	
POLS 137	Policy Analysis, Design and Implementation	
POLS 140	Global Grand Challenges	
PSYC 101	Introduction to Psychology	
SOCI 101	Introduction to Sociology	
SOCI 105	AI and Society	
SOCI 111	Community Service and Engagement	
SOCI 115	Comparative Theories and Methods	
SOCI 117	Technology, Innovation, and Society	

SOCI 137 Global Citizenship and Social Responsibility		
<b>Total Hours</b>		<b>131</b>
<b>Freshman</b>		
<b>First Semester</b>		
CHEM 127	General Chemistry I	4
MATH 161	Engineering Mathematics I	4
ENGR 110	Introduction to Programming	3
ENGL 114	Composition and Rhetoric	3
UCC	Univ. Core Elective	3
<b>Semester Hours</b>		<b>17</b>
<b>Second Semester</b>		
CHEM 130	General Chemistry II	4
PHYS 216	Newtonian Mechanics for Engineering and Science	3
PHYS 226	Experimental Physics & Engineering Lab I: Mechanics	2
MATH 162	Engineering Mathematics II	4
UCC	Univ. Core Elective	3
<b>Semester Hours</b>		<b>16</b>
<b>Sophomore</b>		
<b>First Semester</b>		
MATH 261	Engineering Mathematics III	3
PHYS 217	Electricity and Magnetism for Engineering and Science	3
PHYS 227	Experimental Physics & Engineering Lab II: Electricity and Magnetism	2
CHEM 227	Organic Chemistry I	3
CHEM 237	Organic Chemistry I - Lab	1
CHEM 201	Chemical Engineering Foundation	2
CHEM 204	Elementary Chemical Engineering	3
<b>Semester Hours</b>		<b>17</b>
<b>Second Semester</b>		
ENGL 220	Technical Writing	3
MATH 318	Differential Equations	3
CHEM 228	Organic Chemistry II	3
CHEM 238	Organic Chemistry II - Lab	1
CHEM 205	Thermodynamics I	3
UCC	Univ. Core Elective	3
<b>Semester Hours</b>		<b>16</b>
<b>Junior</b>		
<b>First Semester</b>		
ENGR 482	Ethics and Engineering	3
CHEM 304	Fluid Mechanics	3
CHEM 354	Thermodynamics II	3
CHEM 320	Numerical Methods in Chemical Engineering	3
CHEM 322	Materials Engineering	3
CHEM 381	Seminar	1
<b>Semester Hours</b>		<b>16</b>
<b>Second Semester</b>		
CHEM 364	Reaction Kinetics and Reactor Design	3
CHEM 368	Physical Chemistry for Chemical Engineers	3
CHEM 323	Heat Transfer	3
CHEM 324	Mass Transfer	3
UCC	Univ. Core Elective	3
<b>Semester Hours</b>		<b>15</b>
<b>Third Semester</b>		
CHEM 391	Internship	0
<b>Semester Hours</b>		<b>0</b>
<b>Senior</b>		
<b>First Semester</b>		
CHEM 425	Process Optimization and Economics	3
CHEM 432	Unit Operation Lab I	2
CHEM 455	Process Safety and Risk Analysis	3
CHEM 461	Process Control	3
Technical Area Elective		3
UCC: Univ. Core Elective		3
<b>Semester Hours</b>		<b>17</b>

<b>Second Semester</b>		
CHEM 426	Plant Design	3
CHEM 482	Bioprocess Engineering	3
CHEM 433	Unit Operation Lab II	2
Technical Area Elective		3
Technical Area Elective		3
UCC: Univ. Core Elective		3
<b>Semester Hours</b>		<b>17</b>
<b>Total Hours</b>		<b>131</b>