

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

AY2023 - 2024 Intake onwards

with Professional Internship

Programme	Year of Study	Number of Academic Units (AU)					Total
		Major Requirement		Interdisciplinary Collaborative Core		Broadening and Deepening Electives (BDE)	
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry with 2nd Major in Sustainability	1	17/18*		11		9	37/38*
	2	21		6	3	6	36
	3	18			2	18	38
	4		12		10	6	28
	Total	56/57*	12	17	15	39	139/140*

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

Category	AU	Total AU	
Common Core (University-level)			
Interdisciplinary Collaborative Core (ICC)	CC0001 Inquiry and Communication in the Interdisciplinary World	2	17
	CC0002 Navigating the Digital World	2	
	CC0003 Ethics & Civics in a Multi-Cultural World	2	
	CC0005 Healthy Living & Wellbeing	3	
	CC0006 Sustainability: Society, Economy & Environment	3	
	CC0007 Science & Technology for Humanity	3	
	ML0004 Career and Entrepreneurial Development for the Future World	2	
Foundational Core (College-level)			
	HW0218 Communication Across the Sciences	2	15
	PS0002 Introduction to Data Science and Artificial Intelligence	3	
	CM4081 Professional Internship	10	
CHEM Core			
Major Requirement	CM1001 Foundations of Chemistry I	4	56/57*
	CM1002 Foundations of Chemistry II	4	
	MH1802 Calculus for the Sciences	4	
	CM1804 Mathematics for Chemistry	2	
	PH1011 Physics <u>or</u> PH1012* Physics A	3/4*	
	CM2021 Inorganic and Bioinorganic Chemistry	3	
	CM2011 Analytical Chemistry	3	
	CM2061 Chemistry & Biological Chemistry Laboratory 1	3	
	PS0001 Introduction to Computational Thinking	3	
	CM2031 Organic and Bioorganic Chemistry	3	
	CM2041 Physical and Biophysical Chemistry 1	3	
	CM2062 Chemistry & Biological Chemistry Laboratory 2	3	
	CM3011 ^{&} Chemical Spectroscopy and Applications	3	
	CM3041 ^{&} Physical and Biophysical Chemistry 2	3	
	CM3062 Chemistry & Biological Chemistry Laboratory 4	3	
	CM3031 ^{&} Organic Reaction Mechanisms and Synthesis	3	
	CM3021 ^{&} Organometallic Chemistry	3	
	CM3061 Chemistry & Biological Chemistry Laboratory 3	3	
	CHEM Major Prescribed Electives (MPE)		
	4 x MPEs	12	12

2nd Major in Sustainability	<p>Sustainability Compulsory Courses <i>Choose 1 Course from EACH of the 5 Knowledge Area</i></p> <p>1) PEOPLE EM5109 Environmental Issue & Sustainability (3AU) ES5006 Environmental Sustainability (3AU) HV5001 Introduction to Environmental Humanities (3AU)</p> <p>2) Planet ES5001 Natural Hazards and Society (3AU) ES5005 Environmental Earth System Science (3AU) ES5007 Climate and Climate Change (3AU)</p> <p>3) Profit AB0603 Social Entrepreneurship (3AU) HE5091 Principles of Economics (3AU)</p> <p>4) Practice EM5103 Water Resources Management (3AU) EM5104 Air Quality Management (3AU) EG1001 Engineers in Society (2AU)</p> <p>BM2517 Marketing Sustainability for the Next Generation (3AU)</p> <p>5) Policy HU1002 Introduction to Urban Planning (3AU) HA1001 Introduction to International Relations and Foreign Policy (3AU) HA1003 Introduction to Public Administration and Public Policy (3AU)</p> <p>Interdisciplinary Project</p> <p>Sustainability Electives Choose 3- 4 courses from the list of electives (min. 12 AUs) https://www.ntu.edu.sg/ase/admissions/undergraduate-programmes/second-major-in-sustainability#Content_C002_Col00</p>	14 - 15	30
	3		
	12 - 13		
	<i>Students are responsible to plan for their 2nd major courses</i>		
BDE	Any 3 BDE	9	9
Total			139/140*

*Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).

& CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)							
Suggested Study Plan for AY2023-2024 intake							
<i>with Professional Internship</i>							
Year 1 Semester 1				Year 1 Semester 2			
Course		Type	AU	Course		Type	AU
CM1001	Foundations of Chemistry I	C	4	CM1002	Foundations of Chemistry II	C	4
MH1802	Calculus for the Sciences	C	4	CM1804	Mathematics for Chemistry	C	2
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2	PH1011/	Physics <u>or</u>	C	3
CC0002	Navigating the Digital World	CC	2	PH1012*	Physics A (<i>For students without 'A' Level Physics</i>)	C	4
CC0005	Healthy Living & Well-being	CC	3	CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
	BDE 1	BDE	3	ML0004	Career and Entrepreneurial	CC	2
HW0001	<i>Introduction to Academic Communication[#]</i>				SN Compulsory 1	BDE	3
					BDE 2	BDE	3
			18				19/20*
<i># for students who have not cleared QET</i>							
Year 2 Semester 1				Year 2 Semester 2			
Course		Type	AU	Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3	CM2031	Organic and Bioorganic Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3	CM2041	Physical and Biophysical Chemistry 1	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3	CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0001	Introduction to Computational Thinking	C	3	PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0006	Sustainability: Society, Economy & Environment	CC	3	CC0007	Science & Technology for Humanity	CC	3
	SN Compulsory 2	BDE	3		SN Compulsory 3	BDE	3
			18				18
Year 3 Semester 1				Year 3 Semester 2			
Course		Type	AU	Course		Type	AU
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3	CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
	SN Elective 1	BDE	3		SN Compulsory 4	BDE	3
	SN Elective 2	BDE	3		SN Compulsory 5	BDE	3
	BDE 3	BDE	3		SN Elective 3	BDE	3
			18	HW0218	Communication Across the Sciences	FC	2
							20
Year 4 Semester 1				Year 4 Semester 2			
Course		Type	AU	Course		Type	AU
CM4081	Professional Internship	FC	10		CHEM MPE1	MPE	3
					CHEM MPE2	MPE	3
					CHEM MPE3	MPE	3
					CHEM MPE4	MPE	3
					SN Elective 4	BDE	3
					Interdisciplinary Project	BDE	3
			10				18
						Total (AU)	139/140*

This study plan is meant as a guide.

**Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).*

& CM3xxx refers to CM3011, CM3021, CM3031, CM3041 - These courses are offered in both semesters

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

AY2023 - 2024 Intake onwards

FYP with Professional Attachment

Programme	Year of Study	Number of Academic Units (AU)					Total
		Major Requirement		Interdisciplinary Collaborative Core		Broadening and Deepening Electives (BDE)	
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry with 2nd Major in Sustainability	1	17/18*		11		5	33/34*
	2	21		6	3	6	36
	3	18			7	14	39
	4		22			9	31
	Total	56/57*	22	17	10	34	139/140*

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

Category	AU	Total AU	
Interdisciplinary Collaborative Core (ICC)	Common Core (University-level)		
	CC0001 Inquiry and Communication in the Interdisciplinary World	2	17
	CC0002 Navigating the Digital World	2	
	CC0003 Ethics & Civics in a Multi-Cultural World	2	
	CC0005 Healthy Living & Wellbeing	3	
	CC0006 Sustainability: Society, Economy & Environment	3	
	CC0007 Science & Technology for Humanity	3	
	ML0004 Career and Entrepreneurial Development for the Future World	2	
	Foundational Core (College-level)		
	HW0218 Communication Across the Sciences	2	10
PS0002 Introduction to Data Science and Artificial Intelligence	3		
CM4082 Professional Attachment	5		

Major Requirement	CHEM Core			
	CM1001 Foundations of Chemistry I		4	56/57*
	CM1002 Foundations of Chemistry II		4	
	MH1802 Calculus for the Sciences		4	
	CM1804 Mathematics for Chemistry		2	
	PH1011 Physics <u>or</u> PH1012* Physics A		3/4*	
	CM2021 Inorganic and Bioinorganic Chemistry		3	
	CM2011 Analytical Chemistry		3	
	CM2061 Chemistry & Biological Chemistry Laboratory 1		3	
	PS0001 Introduction to Computational Thinking		3	
	CM2031 Organic and Bioorganic Chemistry		3	
	CM2041 Physical and Biophysical Chemistry 1		3	
	CM2062 Chemistry & Biological Chemistry Laboratory 2		3	
	CM3011 ^{&} Chemical Spectroscopy and Applications		3	
	CM3041 ^{&} Physical and Biophysical Chemistry 2		3	
	CM3062 Chemistry & Biological Chemistry Laboratory 4		3	
	CM3031 ^{&} Organic Reaction Mechanisms and Synthesis		3	
	CM3021 ^{&} Organometallic Chemistry		3	
	CM3061 Chemistry & Biological Chemistry Laboratory 3		3	
	CHEM Major Prescribed Electives (MPE)			
CM4080 Honours Project 1		10	22	
4 x MPEs		12		

2nd Major in Sustainability	<p>Sustainability Compulsory Courses <i>Choose 1 Course from EACH of the 5 Knowledge Area</i></p> <p>1) PEOPLE EM5109 Environmental Issue & Sustainability (3AU) ES5006 Environmental Sustainability (3AU) HV5001 Introduction to Environmental Humanities (3AU)</p> <p>2) Planet ES5001 Natural Hazards and Society (3AU) ES5005 Environmental Earth System Science (3AU) ES5007 Climate and Climate Change (3AU)</p> <p>3) Profit AB0603 Social Entrepreneurship (3AU) HE5091 Principles of Economics (3AU)</p> <p>4) Practice EM5103 Water Resources Management (3AU) EM5104 Air Quality Management (3AU) EG1001 Engineers in Society (2AU) BM2517 Marketing Sustainability for the Next Generation (3AU)</p> <p>5) Policy HU1002 Introduction to Urban Planning (3AU) HA1001 Introduction to International Relations and Foreign Policy (3AU) HA1003 Introduction to Public Administration and Public Policy (3AU)</p> <p>Interdisciplinary Project</p> <p>Sustainability Electives Choose 3- 4 courses from the list of electives (min. 12 AUs) https://www.ntu.edu.sg/ase/admissions/undergraduate-programmes/second-major-in-sustainability#Content_C002_Col00)</p>	14 - 15	30
	3	12 - 13	
<i>Students are responsible to plan for their 2nd major courses</i>			
BDE	Any 2 BDE	4	4
Total		139/140*	

*Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).

& CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

Suggested Study Plan for AY2023-2024 intake

FYP with Professional Attachment Option

Year 1 Semester 1

Course		Type	AU
CM1001	Foundations of Chemistry I	C	4
MH1802	Calculus for the Sciences	C	4
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2
CC0002	Navigating the Digital World	CC	2
CC0005	Healthy Living & Well-being	CC	3
	BDE 1	BDE	2
HW0001	Introduction to Academic Communication [#]		

17
[#] for students who have not cleared QET

Year 1 Semester 2

Course		Type	AU
CM1002	Foundations of Chemistry II	C	4
CM1804	Mathematics for Chemistry	C	2
PH1011/	Physics <u>or</u>	C	3
PH1012*	Physics A (For students without 'A' Level Physics)	C	4
CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
ML0004	Career and Entrepreneurial Development for the Future World	CC	2
	SN Compulsory 1	BDE	3

16/17*
Year 2 Semester 1

Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3
PS0001	Introduction to Computational Thinking	C	3
CC0006	Sustainability: Society, Economy & Environment	CC	3
	SN Compulsory 2	BDE	3

18
Year 2 Semester 2

Course		Type	AU
CM2031	Organic and Bioorganic Chemistry	C	3
CM2041	Physical and Biophysical Chemistry 1	C	3
CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0007	Science & Technology for Humanity	CC	3
	SN Compulsory 3	BDE	3

18
Year 3 Semester 1

Course		Type	AU
CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3
	SN Elective 1	BDE	3
	SN Elective 2	BDE	3
	BDE 2	BDE	2

17
Year 3 Semester 2

Course		Type	AU
CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3
CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
	SN Compulsory 4	BDE	3
	SN Compulsory 5	BDE	3
	SN Elective 3	BDE	3
HW0218	Communication Across the Sciences	FC	2

Year 3 Special Sem

CM4082	Professional Attachment	FC	5
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25
Year 4 Semester 1

Course		Type	AU
	CHEM MPE1	MPE	3
	CHEM MPE2	MPE	3
	CHEM MPE3	MPE	3
	CHEM MPE4	MPE	3
	SN Elective 4	BDE	3

15
Year 4 Semester 2

Course		Type	AU
CM4080	Honours Project 1	MPE	10
	Interdisciplinary Project	BDE	3

13
Total (AU)
139/140*

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BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

AY2023 - 2024 Intake onwards

with Professional Internship and FYP

Programme	Year of Study	Number of Academic Units (AU)					Total
		Major Requirement		Interdisciplinary Collaborative Core		Broadening and Deepening Electives (BDE)	
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry with 2nd Major in Sustainability	1	17/18*		11		5	33/34*
	2	21		6	3	6	36
	3	18			7	14	39
	4		22			9	31
	Total	56/57*	22	17	10	34	139/140*

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)

Category	AU	Total AU	
Interdisciplinary Collaborative Core (ICC)	Common Core (University-level)		
	CC0001 Inquiry and Communication in the Interdisciplinary World	2	17
	CC0002 Navigating the Digital World	2	
	CC0003 Ethics & Civics in a Multi-Cultural World	2	
	CC0005 Healthy Living & Wellbeing	3	
	CC0006 Sustainability: Society, Economy & Environment	3	
	CC0007 Science & Technology for Humanity	3	
	ML0004 Career and Entrepreneurial Development for the Future World	2	
Foundational Core (College-level)			
HW0218 Communication Across the Sciences	2	15	
PS0002 Introduction to Data Science and Artificial Intelligence	3		
CM4081 Professional Internship	10		

Major Requirement	CHEM Core			
	CM1001 Foundations of Chemistry I		4	56/57*
	CM1002 Foundations of Chemistry II		4	
	MH1802 Calculus for the Sciences		4	
	CM1804 Mathematics for Chemistry		2	
	PH1011 Physics <u>or</u> PH1012* Physics A		3/4*	
	CM2021 Inorganic and Bioinorganic Chemistry		3	
	CM2011 Analytical Chemistry		3	
	CM2061 Chemistry & Biological Chemistry Laboratory 1		3	
	PS0001 Introduction to Computational Thinking		3	
	CM2031 Organic and Bioorganic Chemistry		3	
	CM2041 Physical and Biophysical Chemistry 1		3	
	CM2062 Chemistry & Biological Chemistry Laboratory 2		3	
	CM3011 ^{&} Chemical Spectroscopy and Applications		3	
	CM3041 ^{&} Physical and Biophysical Chemistry 2		3	
	CM3062 Chemistry & Biological Chemistry Laboratory 4		3	
	CM3031 ^{&} Organic Reaction Mechanisms and Synthesis		3	
	CM3021 ^{&} Organometallic Chemistry		3	
	CM3061 Chemistry & Biological Chemistry Laboratory 3		3	
	CHEM Major Prescribed Electives (MPE)			
CM4080 Honours Project 1		10	22	
4 x MPEs		12		

<p>2nd Major in Sustainability</p>	<p>Sustainability Compulsory Courses <i>Choose 1 Course from EACH of the 5 Knowledge Area</i></p> <p>1) PEOPLE EM5109 Environmental Issue & Sustainability (3AU) ES5006 Environmental Sustainability (3AU) HV5001 Introduction to Environmental Humanities (3AU)</p> <p>2) Planet ES5001 Natural Hazards and Society (3AU) ES5005 Environmental Earth System Science (3AU) ES5007 Climate and Climate Change (3AU)</p> <p>3) Profit AB0603 Social Entrepreneurship (3AU) HE5091 Principles of Economics (3AU)</p> <p>4) Practice EM5103 Water Resources Management (3AU) EM5104 Air Quality Management (3AU) EG1001 Engineers in Society (2AU) BM2517 Marketing Sustainability for the Next Generation (3AU)</p> <p>5) Policy HU1002 Introduction to Urban Planning (3AU) HA1001 Introduction to International Relations and Foreign Policy (3AU) HA1003 Introduction to Public Administration and Public Policy (3AU)</p> <p>Interdisciplinary Project</p> <p>Sustainability Electives Choose 3- 4 courses from the list of electives (min. 12 AUs) https://www.ntu.edu.sg/ase/admissions/undergraduate-programmes/second-major-in-sustainability#Content_C002_Col00</p>	<p>14 - 15</p> <p>3</p> <p>12 - 13</p>	<p>30</p>
<p>Total</p>		<p>139/140*</p>	

*Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).

& CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

BSc in Chemistry and Biological Chemistry with 2nd Major in Sustainability (CHSN)							
Suggested Study Plan for AY2023-2024 intake							
<i>with Professional Internship and FYP</i>							
Year 1 Semester 1				Year 1 Semester 2			
Course		Type	AU	Course		Type	AU
CM1001	Foundations of Chemistry I	C	4	CM1002	Foundations of Chemistry II	C	4
MH1802	Calculus for the Sciences	C	4	CM1804	Mathematics for Chemistry	C	2
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2	PH1011/	Physics <u>or</u>	C	3
CC0002	Navigating the Digital World	CC	2	PH1012*	Physics A (<i>For students without 'A' Level Physics</i>)	C	4
CC0005	Healthy Living & Well-being	CC	3	CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
HW0001	<i>Introduction to Academic Communication</i> [#]			ML0004	Career and Entrepreneurial Development for the Future World	CC	2
				SN Compulsory 1		BDE	3
			15				16/17*
[#] for students who have not cleared QET							
Year 2 Semester 1				Year 2 Semester 2			
Course		Type	AU	Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3	CM2031	Organic and Bioorganic Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3	CM2041	Physical and Biophysical Chemistry 1	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3	CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0001	Introduction to Computational Thinking	C	3	PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0006	Sustainability: Society, Economy & Environment	CC	3	CC0007	Science & Technology for Humanity	CC	3
	SN Compulsory 2	BDE	3	SN Compulsory 3		BDE	3
				SN Elective 1		BDE	3
			18				21
Year 3 Semester 1				Year 3 Semester 2			
Course		Type	AU	Course		Type	AU
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3	CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
CM3xxx ^{&}	CHEM-Core	C	3		SN Compulsory 4	BDE	3
CM3062	Chemistry & Biological Chemistry	C	3		SN Compulsory 5	BDE	3
	SN Elective 2	BDE	3		SN Elective 4	BDE	3
	SN Elective 3	BDE	3	HW0218	Communication Across the Sciences	FC	2
					CHEM MPE1	MPE	3
					5 MPE	MPE	3
			18				23
Year 4 Semester 1				Year 4 Semester 2			
Course		Type	AU	Course		Type	AU
CM4081	Professional Internship	FC	10	CM4080	Honours Project 1	MPE	10
					CHEM MPE3	MPE	3
					CHEM MPE4	MPE	3
					Interdisciplinary Project	BDE	3
			10				19
						Total (AU)	139/140*

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^{*}Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).

[&] CM3xxx refers to CM3011, CM3021, CM3031, CM3041 - These courses are offered in both semesters